43533

National Library of Canada / Bibliothèque nationale du Canada

CANADIAN THESES ON MICROFICHE / THÈSES CANADIENNES SUR MICROFICHE

NAME OF AUTHOR/*NOM DE L'AUTEUR* Sharon Rich

TITLE OF THESIS/*TITRE DE LA THÈSE* The Effects of Advance Organizers, Interjected in Text, on the Reading Recalls of Eighth Grade Students

UNIVERSITY/*UNIVERSITÉ* University of Alberta

DEGREE FOR WHICH THESIS WAS PRESENTED/*GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE* M Ed

YEAR THIS DEGREE CONFERRED/*ANNÉE D'OBTENTION DE CE GRADE* 1979

NAME OF SUPERVISOR/*NOM DU DIRECTEUR DE THÈSE* Dr. J. E. Robertson

Permission is hereby granted to the NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

L'autorisation est, par la présente, accordée à la BIBLIOTHÈQUE NATIONALE DU CANADA de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans l'autorisation écrite de l'auteur.

DATED/*DATÉ* April 5/1979 SIGNED/*SIGNÉ* Sharon J Rich

PERMANENT ADDRESS/*RÉSIDENCE FIXÉ* 68-70 Fiddler's Green Road
LONDON, ONTARIO
CANADA

NL-91 (3-74)

National Library of Canada

Cataloguing Branch
Canadian Theses Division

Ottawa, Canada
K1A 0N4

Bibliothèque nationale du Canada

Direction du catalogage
Division des thèses canadiennes

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

NL-339 (3/77)

THE UNIVERSITY OF ALBERTA

THE EFFECTS OF ADVANCE ORGANIZERS INTERJECTED IN TEXT ON THE READING RECALLS OF EIGHTH GRADE STUDENTS

by

© SHARON J. RICH

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA

FALL, 1979

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "The Effects of Advance Organizers Interjected in Text on the Reading Recalls of Eighth Grade Students" submitted by Sharon J. Rich in partial fulfilment of the requirements for the degree of Master of Education.

Jean E. Robertson
Supervisor

M. V. Arnold

R. Shuttleworth

Date August 22, 1978

ABSTRACT

Reading can be regarded as an active, dynamic process in which the reader interacts with the print information. At the junior high level, as styles of writing vary and the student is expected to gain more and different information from print, some students seem to have difficulty in developing the most effective strategies for interaction with print. It could be that these students need an extra organizational aid to help them conduct dialogues with the author. Advance organizers, by providing a conceptual framework for reading, may help these students in the reading process. The major purpose of this study was to determine whether superordinate advance organizers interjected in text would enable eighth grade students to recall more information of a main idea and factual level than coordinate advance organizers or control statements.

In this study 80 eighth grade students representing a range of reading ability from low to average to high achievement were selected from a population of 180 students in one large, urban junior high school. Subjects were assigned to one of four groups so that equal numbers of males and females were represented and there were equal numbers of high, average and low achievers in each group.

Students were asked to read a fifteen-paragraph narrative/expository English literature passage which contained one of superordinate advance organizers, coordinate advance organizers, interjected control statements or uninterrupted reading. The organizers were interjected in text before each two-paragraph text segment to insure that processing would occur across the whole passage. Oral recalls were

taken immediately after reading, then these recalls were transcribed and analyzed using a minimal-text-reduction process.

A one-way analysis of variance and Newman-Keuls procedure revealed significant differences between the superordinate advance organizer group and each of the coordinate advance organizer group, the interjected statement group and the uninterrupted reading group in both the number of main ideas and facts recalled from first paragraph segments and in the number of main ideas and facts recalled from second paragraph segments of the passage.

These findings suggest that superordinate advance organizers interjected in text provide assistance in recalling main ideas and facts for the junior high reader and may be an efficient reading aid for eighth-grade students. Other conclusions were drawn also from the findings and suggestions for further research made.

ACKNOWLEDGEMENTS

I wish to acknowledge the assistance and express my sincere appreciation to:

Dr. Jean E. Robertson, supervisor, for the patient guidance, challenging questions and gentle encouragement given throughout all phases of this study.

Dr. Warren Wilde and Dr. R. G. Martin, the other members of the committee, for their interest in and careful reading of the study.

The administrators, principals, teachers and students of the Edmonton Public School Board, for their cooperation during the study.

Alan for his support and encouragement.

Finally I would like to acknowledge Tasha, who, by her very existence, reminds me that meaningful learning is a natural, joyous process that can never be quantified.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	INTRODUCTION OF THE STUDY	1
	Purpose of the Study	4
	Significance of the Study	5
	Definition of Terms	7
	Research Questions and Hypotheses	9
	Procedures	11
	Limitations of the Study	12
	Assumptions	12
	Organization of the Report	12
II.	BACKGROUND OF THE STUDY	13
	Introduction	13
	The Structure of Knowledge and Learning Theory	13
	The Nature of Memory	16
	Studies Involving the Use of Advance Organizers	20
	Studies with College Level Readers	20
	The Influence of Interspersion of Organizers on Text Processing and Oral Recalls	23
	Studies of Advance Organizers at the Junior High Level	24
	Rationale for the Examination of Certain Sample Variables	27
	Cognitive Processing	27
	Life Experience Factors	28
	Reading Achievement	29
	Reading Time	30

CHAPTER

PAGE

Verbal Intelligence 30

Summary 31

III. THE DEVELOPMENT AND EXPERIMENTAL DESIGN OF THE STUDY 32

The Design of the Study 32

The Student Population and Samples 33

Selection of the Samples 33

Control of Sample Variables 35

Selection of the Reading Passage 41

Writing and Selection of Advance Organizers 44

Superordinate Advance Organizers 44

Coordinate Advance Organizers 44

Organization of Passage Segments and Organizers 45

Collection and Analysis of Data 46

Collection and Analysis of Reading Recalls 46

The Test of Clustering in Recall 47

Statistical Analyses of Data 49

The Pilot Study 49

Summary 52

IV. FINDINGS AND DISCUSSION OF THE STUDY 53

Assumptions Underlying the Analysis of Variance . . . 53

Findings Related to Null Hypotheses 55

Differences in Performance of Groups in Recall of Main Ideas and Facts from Across the Passage . . . 80

Correlations for Total Number of Main Ideas and Total Number of Facts Recalled 85

Summary 90

CHAPTER PAGE

V. SUMMARY, CONCLUSIONS AND IMPLICATIONS 92

Summary of the Study 92

Main Findings and Conclusions 93

General Conclusions 98

Limitations 99

Implications of this Study 100

Suggestions for Further Research 102

Concluding Statement 104

BIBLIOGRAPHY 105

APPENDIX A. PASSAGE CONTAINING INTERJECTED SUPERORDINATE ADVANCE ORGANIZERS 111

APPENDIX B. AN ORDERED LIST OF COORDINATE STATEMENT ADVANCE ORGANIZERS AND INTERJECTED CONTROL STATEMENTS 128

APPENDIX C. UNINTERRUPTED READING PASSAGE 131

LIST OF TABLES

TABLE		PAGE
3.1	Summary of Treatment Group Variables: Main Study	37
3.2	Analysis of Variance: Differences in Means of Scores on Verbal Intelligence	38
3.3	Analysis of Variance: Differences in Means of Scores on Reading Words	39
3.4	Analysis of Variance: Differences in Means of Scores on Reading Paragraphs	40
3.5	Analysis of Variance: Differences in Means of Scores on the Test of Clustering in Recall	42
3.6	Summary of Treatment Group Variables: Pilot Study	51
4.1	Analysis of Variance: Number of Main Ideas Recalled from First-Paragraph Segments	58
4.2	Analysis of Variance: Number of Main Ideas Recalled from Second-Paragraph Segments	64
4.3	Analysis of Variance: Mean Number of Facts Recalled from First-Paragraph Segments	72
4.4	Analysis of Variance: Mean Number of Facts Recalled from Second-Paragraph Segments	78
4.5	Analysis of Variance: Mean Number of Main Ideas Recalled from Across the Total Passage	82
4.6	Analysis of Variance: Mean Number of Facts of Facts from Across the Passage	84
4.7	Correlations Between Total Number of Main Ideas Recalled and Selected Sample Variables	86
4.8	Correlations Between Total Number of Facts Recalled and Selected Sample Variables	89

LIST OF FIGURES

FIGURE		PAGE
4.1	Total Number of Main Ideas Recalled from First-Paragraph Segments by Each Group	56
4.2	Mean Number of Main Ideas Recalled from First-Paragraph Segments	57
4.3	Total Number of Main Ideas Recalled from Second-Paragraph Segments by Each Group	62
4.4	Mean Number of Main Ideas Recalled from Second-Paragraph Segments	67
4.5	Total Number of Facts Recalled from First-Paragraph Segments	69
4.6	Mean Number of Facts Recalled from First-Paragraph Segments	71
4.7	Total Number of Facts Recalled from Second-Paragraph Segments by Each Group	75
4.8	Mean Number of Facts Recalled from Second-Paragraph Segments by Each Group	77
4.9	Mean Number of Main Ideas Recalled by Individuals in Each Group from Across the Total Passage	81
4.10	Mean Number of Facts Recalled by Individuals in Each Group from Across Total Passage	83

Chapter I

INTRODUCTION OF THE STUDY

Children arrive at school with a wealth of oral language and are competent in conversing with others through the use of this language to a level that reflects their needs of the moment. At school they must develop an equal competency with the use of print. This competency, developed over time, involves the children's acquiring an understanding that reading and writing are both meaningful tasks; the ultimate goal for both tasks being communication. As writers children learn to encode messages in print; as readers they learn to reconstruct, interpret and evaluate messages written by others. Information contained within print can then be synthesized with that already held within the reader's mind and used in thinking and reasoning operations later.

One task of the school in teaching reading, then, is that of aiding children in the reconstruction and expansion of meaning from print. Substantial assistance in this task at the elementary school level is given through class discussions of a selection prior to reading and through questions posed before and after reading so that students develop a frame of reference for the story content.

An additional means of assisting students in this reconstruction of meaning has been through the use of stories which reflect experiences common to a number of students. These stories in the primary grades may be those developed through language experience

activities, while in upper elementary and junior high schools, some publishers and writers have become more sensitive to the type of material in which students may have a background. In these instances, then, students can approach reading with an experiential frame which makes it easier for them to reconstruct meaning from print.

At the junior high level, however, students are expected increasingly to independently reconstruct meaning from print material which has an unfamiliar content. The junior high reader's task is further complicated by the increasing amount of print with which she has to cope and by less class reading time. The student is expected now to carry on her own dialogue with the author and many students seem to find this transition to independent reading difficult. It could be that these students need an extra organizational aid to help them in conducting this dialogue.

It has been suggested by some researchers (Ausubel and Fitzgerald, 1962; Ausubel, 1968; Rickards, 1976) that advance organizers, statements of concepts or main ideas, by presenting an approach for the organization, reconstruction and evaluation of meaning from print, help readers to assimilate information from what is read. The advance organizer provides some information for the reader about the selection to be read and because the organizer is usually more general in nature, it may also link the print material to other information already in the reader's experience. The advance organizer becomes the link between the potential meaning of the subject matter (the author's meaning) and the actual meaning of

that material to a particular reader. Given a framework for reading, the reader can attend to information which expands that frame and which also makes sense in terms of information already possessed.

At the college level several studies have been done to determine the use of advance organizers in helping students read material from unfamiliar subject areas. In these research studies (Ausubel and Fitzgerald, 1962; Campbell and Borich, 1972; Sanders, 1975) some improvement in the recall of information from print was noted among both average and above average students; however, of these students, those who scored low on tests of verbal ability derived most benefit in terms of the amount of information recalled.

Only a few studies involving the use of advance organizers with junior high school students have been conducted. The results of these studies were not definitive (Barnes and Clawson, 1975) because of limited generalizability of results and, in some instances, a lack of randomization of student sample. Since there was a paucity of definitive research with the use of advance organizers at the junior high level and one of the reading problems at this level seemed to be a need for the reader to have assistance in reconstructing meaning from print, it seemed appropriate to conduct an additional study with a group of junior high school students who represent a range of reading ability from low to average to high. This study attempted to examine the effects of the advance organizers on the content of the information recalled by the student from print.

The nature of the advance organizers used in previous studies has ranged from one of a 500 word introductory passage, written at a

superordinate level (Ausubel and Fitzgerald, 1962; Ausubel, 1968), to pre-reading factual and reasoning questions (Doake, 1972), to single statement superordinate and coordinate statements interspersed in the passage (Rickards, 1976). In Rickards' (1976) study, a superordinate statement was defined as a generalization implied within a paragraph of text material while a coordinate statement was one which was a verbatim rewrite of a paragraph sentence. In this study (Rickards, 1976), it was found that advance organizers of a superordinate nature facilitated the recall of the organizer and of details related to the organizer. In addition, concepts derivable from the passage but incidental to the organizer were generated.

Rickards, at the conclusion of his 1976 study, suggested that the use of interspersed advance organizers with readers needed to be further investigated to determine whether exposure to this type of organizer would help the reader develop more effective organizational strategies.

Since many junior high readers seem to need an extra organizational aid of some type to reconstruct and expand meaning from print, the use of advance organizers may be beneficial. The primary problem of this study then is to investigate whether advance organizers do aid junior high school readers in obtaining and organizing information from print.

Purpose of the Study

The major purpose of the study was to investigate the effects of advance organizers, both superordinate and coordinate statements

interjected within a fifteen-paragraph text, on the content of the reading recalls of eighth-grade readers. The effects of the advance organizers on the reading recalls were examined through the number and position of main ideas recalled and through the number and position of facts supporting main ideas recalled from the fifteen-paragraph passage. The effects of advance organizers were examined under four conditions as follows:

1. Superordinate advance organizers (statements of main ideas) interjected before two-paragraph text segments.

2. Coordinate advance organizers (verbatim sentences from the following paragraph) interjected before two-paragraph text segments.

3. Statements which announced a segment change (e.g. This is segment one.) interjected before two-paragraph text segments.

4. No statements interjected in text.

Significance of the Study

The summary of the research and the findings of the study suggest a number of implications for teaching in general and for the teaching of reading specifically.

Some research suggests that when readers or learners are given the framework provided by an advance organizer they are able to organize new information better and can recall more of this information later. If the present study supports this viewpoint then, for educators at all levels, the need for outlining the major purposes or goals of a course so that students are alerted to specific material

which is pertinent to those stated goals will be apparent. From the initial years of the elementary school, attention should be given to the establishment of purposes for reading which encompass the inferential and evaluative as well as the literal aspects of the reading task. Students could be taught to establish their own purposes for reading and eventually to develop their own advance organizers using their own experiences and classroom discussions of an area as a basis for this development.

Once able to construct their own advance organizers, students could develop note-taking and study strategies which have this kind of organizer as a basis. Through use of advance organizers students would have notes which are developed around central concepts or main ideas from a passage. The nature of memory is such that these more general concepts should be remembered (Ausubel, 1968) and students would have more information available to them at a later time.

For some students advance organizers interjected in texts may be a major aid in reconstruction of meaning of print. Text material, particularly that of a more detailed, factual nature may indeed need this kind of interpretation for some students. Teachers and publishers might consider developing appropriate organizers for such text material so that students can understand it better.

In teacher education courses, students could be made aware of advance organizers and the way in which they are constructed. Lessons in reading could then be planned so that new material would not be introduced until an attempt had been made to relate it to previous information. Without an awareness of the role of advance organizers

inexperienced teachers may not be able to lead students to appropriate independent organization of print material.

Definition of Terms

The following terms were used for this study.

Interjected

This term applied to the organizers and the way in which they were placed in text. An organizer interjected in text was one which was typed on a sheet of 210 x 270 mm paper and placed within the text before a two-paragraph segment. In this study, organizers were interjected before each two-paragraph text segment so that there were eight interjections read by the two treatment groups and control group one.

Advance Organizer

In this study an advance organizer was a written statement which aided the reader's recall and organization of passage information. For this study only two specific types of advance organizer were considered: the superordinate advance organizer and the coordinate advance organizer.

Superordinate Advance Organizer

The superordinate statement was defined by Rickards (1976) as a statement of concept or generalization implied within text material. In this study a superordinate advance organizer was a statement representing a main idea, stated or implied in the first paragraph of a two-paragraph text segment. Its role was that of assisting the reader in the reconstruction and organization of information from the

first paragraph of a two-paragraph text segment and of leading the reader to independent organization of the second paragraph of the text segment.

Coordinate Advance Organizer

A coordinate advance organizer was a single factual statement taken directly from the first paragraph of a two-paragraph text segment and repeated in the text immediately before the reader read the following paragraph. These organizers were not statements of main ideas; however, they could assist the reader in organizing the first and second paragraphs of the two-paragraph text segment.

Control Statement

These statements were indications that the reader was about to read another text segment and were written: "This is segment one." These were placed before each two-paragraph segment of a fifteen-paragraph passage.

Uninterrupted Reading

Although none of the students were interrupted in their reading by the researcher, the term uninterrupted reading specifically referred to the conditions of control group two in which no organizers were interjected in the text.

Main Ideas

These were generalizations, stated or implied, in either the first or second paragraph of a two-paragraph text segment. When selected main ideas were given to students as superordinate statement advance organizers, they were placed in text immediately before the

paragraph to which they related.

Facts

These were selected pieces of information which contributed to the development of the main idea contained in either paragraph of a text segment. In the case of the coordinate statement advance organizer, certain facts from the text were repeated in the organizer.

Research Questions and Hypotheses

Research Question 1

Will superordinate advance organizers interjected before each two-paragraph text segment produce recall of more main ideas from the first paragraphs of two-paragraph text segments than coordinate advance organizers, interjected control statements or uninterrupted reading?

Null Hypothesis 1

There will be no significant difference between treatment groups in the mean number of main ideas recalled from first paragraphs of two-paragraph text segments.

Research Question 2

Will superordinate advance organizers interjected in text before each two-paragraph text segment produce recall of more main ideas from second paragraphs of two-paragraph text segments than interjected coordinate advance organizers, interjected control statements or uninterrupted reading?

Null Hypothesis 2

There will be no significant difference between treatment groups in the mean number of main ideas recalled from second paragraphs of two-paragraph text segments.

Research Question 3

Will interjected superordinate advance organizers produce recall of more facts from the first paragraphs of two-paragraph text segments than interjected coordinate advance organizers, interspersed control statements or uninterrupted reading?

Null Hypothesis 3

There will be no significant difference between treatment groups in the mean number of facts recalled from first paragraphs of two-paragraph text segments.

Research Question 4

Will interspersed superordinate advance organizers produce a recall of more facts from second paragraphs of two-paragraph text segments than interspersed coordinate advance organizers, interspersed control statements or uninterrupted reading?

Null Hypothesis 4

There will be no significant difference between treatment groups in the mean number of facts recalled from the second paragraphs of two-paragraph text segments.

Procedures

The present investigation was conducted as follows:

1. First was the selection of a fifteen-paragraph, 1,025 word, text passage and the construction of the superordinate and coordinate advance organizers to accompany the passage. The fifteen-paragraph passage was divided into seven, two-paragraph segments and a final single-paragraph segment. The organizers and passage segments were typed on 210 x 270 mm paper and arranged so that each page held either an organizer or a text segment. These pages were then ordered and stapled so that organizers were interjected at designated points in the text. Students in the study received a passage which contained either superordinate advance organizers, coordinate advance organizers, control statements or only the text passage.

2. A random selection of sixteen students was made and they became a group on whom the text passage and data collection methodology were piloted.

3. Data were analysed from the pilot, and the final establishment of criteria for identifying students of average, low and high reading ability was effected.

4. Criteria for the analysis and scoring of reading recalls of students were reassessed.

5. The random selection of eighty students for the main study and their assignment of treatment groups were carried out.

6. Statistical tests, F-ratio, Newman-Keuls procedure for comparing means, and t-ratios, were selected and the data subjected to a one-way analysis of variance. Correlations were also used to

determine the relationship of each group's performance to selected variables which could influence the results of the study.

Limitations of the Study

1. The artificial segmentation of the passage into two-paragraph units could have had an effect on the mental organization of material by the students that overrode the effect of advance organizers.

2. Since only immediate recalls were taken, it could be that the selected effects of the organizers would not emerge until a longer time elapsed.

Assumptions

1. It was assumed that differences in students' experiential background which could influence the reading recalls were randomized across treatment groups.

Organization of the Report

This research investigation will be presented according to the following plan:

Chapter II presents a discussion of the literature related to the problem to be investigated.

Chapter III discusses the experimental design of the study.

Chapter IV presents the findings and a discussion of them.

Chapter V, the final chapter, presents and discusses the main findings, draws conclusions and cites implications of the study.

Chapter II

BACKGROUND OF THE STUDY

Introduction

This chapter has three major sections which combined provide the theoretical framework for this study. The first section discusses the structure of knowledge and learning theory together with the relationship of these to reading. The second section details the nature of memory and the way in which it is related to cognitive processes and reading. Section three outlines the use of advance organizers in education generally, then discusses the use of such organizers in reading. Particular reference is made to studies at the junior high level and a rationale for the consideration of certain student sample variables is given.

The Structure of Knowledge and Learning Theory

If Bloom's (1956) definition of knowledge as the remembering of previously learned material is accepted then, knowledge represents the lowest level of learning outcomes and can be dismissed by those who suggest that the important thing is not what is learned but the process of learning. However, knowledge assumes a greater significance when it is realized that until some basic knowledge is present, it is difficult, if not impossible, to acquire higher level learning outcomes such as synthesis or evaluation. Fundamental to this study is the assumption that there is a structure to knowledge and that the mature

learner can arrange her cognitive structure to correspond to that structure so that learning will be more efficient.

Several curriculum theorists including Schwab (1972) and Popham (1972) have suggested that knowledge does indeed have a logical structure and that each subject discipline has its own hierarchy of information, organization and theory which must be mastered if a student is to acquire some expertise in an area. In support of this concept of logical structure, Gagné (1962), in a report on a study to discover the patterns of learning sets of mathematics material for ninth-grade boys, found that before higher level learning sets could be mastered, the boys had to master lower level sets. However, in his discussion of the study, Gagné suggested that for each of the seven boys in the study there was not a predetermined logical progression through the task. Some of the boys were able to begin the experiment with instructions at the level initially planned, while others needed a review of earlier material, even though all subjects were identified as having equal ability. This phenomenon could possibly be attributed simply to individual differences, but Ausubel (1964) gave a more detailed explanation of this phenomenon when he discussed the relationship between the logical and psychological structure of knowledge.

Ausubel accepted the assumption that subject matter contained logical meaning. However, he went on to suggest that this logical meaning is converted to actual meaning when a particular individual who employs a meaningful learning set incorporates a potentially meaningful proposition or unit of information within his cognitive structure.

In addition, the actual or logical organization of subject matter may be changed by the individual as information is added to his store of knowledge. New information will be subsumed under existing relevant ideas in the cognitive structure (Ausubel, 1964). The psychological organization of this new information, then, may not correspond to the logical organization of the subject matter. Once an individual has developed mature cognitive capacities and has gained a mastery of a particular discipline, she can reorganize the psychological structuring of knowledge to correspond to the logical structure of the discipline (Ausubel, 1964).

The reading process, too, reflects individuals' different structurings of information. The author has imposed her psychological structure on the logical structure of knowledge as she attempts to interpret her views to an unseen reader. The reader, in turn, reads the author's interpretation of this logical structure of knowledge and in her reading imposes her own psychological structure on that information. Certainly there are aspects of the information about which reader and author must agree or no communication occurs. However, once the reader goes beyond a literal level reading of the information, she attempts to order the information so that it corresponds to her own psychological structure, so that she will have access to it later. Sometimes the reader has difficulty with this reorganization process and fails to incorporate new information in such a way that it can be readily retrieved. Some of this new information may be vital for the mastery of a passage of reading material or ultimately the grasp of a discipline. One of the major concerns of the present study is

the reader's structuring of written information for recall both independently and with the help of advance organizers.

Before the selection of advance organizers as an aid for the reader's organization can be understood, it is necessary to detail the nature of memory as described by cognitive psychologists.

The Nature of Memory

Although advocates of stimulus-response learning theory negate the importance of memory, cognitive psychologists tend to give it rather a large role as they view memory as an integral component of the individual's acquisition of knowledge. This study adopts the view of Frank Smith (1971) which suggests that both stimulus-response and cognitive learning theories have a place in reading but that the cognitive viewpoint is most appropriate when discussing the acquisition of knowledge.

According to the cognitive view, memory, although often ignored as merely a centre for the storage of information, also has the even more important function of organizing material for storage. This organization function of memory is of prime importance, for without an appropriate system of storage, it is impossible for the learner to retrieve information.

Research indicates that the brain seems to have three memory systems (Neisser, 1967). The first is a sensory store in which perceptions are initially recorded. The second, short term memory, has a limited capacity for information and determines the selected pieces of data which will ultimately enter long term memory. Short term

memory may cue the reader to attend to particular pieces of information which are related to other concepts already stored in long term memory. Long term memory, which is the third memory system, can store quantities of information in a more precise manner. In long term memory major concepts are stored, and as new information enters from short term memory it is categorized and recorded under the appropriate concepts. When relevant cues are given, perhaps in the form of questions or statements, this information can be recalled and may possibly combine with other data to form new concepts.

Because short term memory has the role of transferring information to long term memory, it seems obvious that short term memory has an important role in the learning of new material. Information held in short term memory has immediate availability and does not need to be rehearsed to get there, although rehearsal is necessary if it is to stay there. The limited capacity of short term memory, however, necessitates that there be an efficient method of transferring information held here into long term memory. Neisser (1967) points out that if the limited capacity of short term memory is exceeded, information must be transferred to long term memory or be lost. Since only one item can go from short term memory to long term memory every five seconds, it is imperative that the information that gets to long term memory be meaningful.

This of course has implications for reading efficiency. The reader must of necessity attempt to gain the meaning of significant phrases or sentences if she is to read with adequate comprehension, for it is these elements which convey the main ideas and themes of

the passage which should ultimately enter storage in long term memory. Once the reader has abstracted the main idea from the print and has stored it in long term memory, it becomes an easier task to relate pertinent details to these main ideas and to combine these main ideas to evaluate and made judgements about what is read.

In reading, the reader perceives combinations of letters and words that are transferred to short term memory. The efficient reader in order to comprehend what is read handles about 200 words a minute (Smith, 1971). If this information is to be retained it must be transferred to long term memory. As Smith (1971) points out, however, getting material into long term memory is not an easy task, so the reader chunks material to insure that units larger than single words arrive in long term memory storage. Smith also suggests that in chunking the material the efficient reader rather than reading single words deals with meaningful units of thoughts such as phrases or sentences. The essence of meaning, rather than individual words, is held in memory. Smith also suggests that good readers are those who ensure that information lost in this chunking process is that which has little relevance to the main idea or theme of a passage. In addition to this problem of getting print information into long term memory is the problem of the organization of the material once it is there.

Ausubel (1969) agreed that readers chunk meaning units in order to make efficient use of the brain's information processing system. However, he was more concerned with what happens to information when it reaches long term memory. He suggested that potentially

meaningful material, in reading what the author has written, is always learned in relation to an individual's existing cognitive background.

In the present study an attempt was made to control for background experiences by selecting students from a similar socio-economic background and by obtaining a measure of the students' verbal intelligence as an attempt to determine the influence of their language facility. For Ausubel, whether or not new material is meaningfully learned depends upon the availability of relevant subsumers or concepts in the individual's cognitive structure. For example, in reading a passage about an island economy, the reader who has some familiarity with a local economy should be able to, in Bloom's (1956) terms, comprehend, analyze, apply, synthesize and evaluate this new information under appropriate subsumers in her long term memory. Once linked with the subsumers already in long term memory, the new information remains discretely available for a time, then becomes incorporated into a modified example of the original subsumer. Ausubel reasoned that if his theory of subsumption was correct, it should be helpful for the learner if an attempt were made to establish appropriate subsumers in long term memory before new material was read. Since several studies have been carried out by Ausubel and his associates, as well as by other independent researchers, which seem to validate this theory of subsumption, Ausubel's conception of memory is accepted for the present study and the findings of the study will be viewed from that perspective.

The findings of the studies conducted by several researchers interested in the nature of memory and cognition are outlined below.

From these studies a rationale for the development of the present study is developed.

Studies Involving the Use of Advance Organizers

Studies with College Level Readers

Barnes and Clawson (1976), in a review of the literature on the use of organizers to facilitate learning, suggested that Ausubel's concept of introducing subsumers prior to instruction was not new but dated back to the nineteenth century philosopher Herbart who suggested that teachers should not present anything completely new to the student. However, it was not until recently that a qualitative investigation of this suggestion was undertaken.

In 1960 Ausubel, using 120 college seniors in educational psychology, compared the use of a 500-word expository advance organizer written at a higher level of concept abstraction with an historical passage of the same length to facilitate the recall of information from a learning passage dealing with metallurgy. The results of this study indicated that the group which received the advance organizer before reading was better able to demonstrate an understanding of the concepts of metallurgy than the control group.

Similar studies by Ausubel and Fitzgerald (1961, 1962) with college students verified original results of the initial study and further determined that differing types of advance organizers produced differing types of recall. For instance when a "comparative" advance organizer which specifically pointed out differences and similarities between material to be learned and that which was already

known was used, it produced significantly higher numbers of concept and factual recalls than expository advance organizers written at the same level of abstraction. Similarly, on a delayed posttest, comparative and expository type advance organizers were more effective in producing higher numbers of concepts recalled than an historical advance organizer which merely detailed background of the learning passage. In the present study narrative/expository advance organizers were used as the reported studies seemed to suggest a reasonable success rate when they were used.

The strategy adopted by Ausubel (1960) for inducing recall of material which involved use of organizers of between 250 and 300 words before 2,000-word passages has been adopted by several researchers. Findings of these studies (Ausubel and Robinson, 1969) generally support Ausubel's theory of subsumption, but often the results have only marginal significance. It could be that the length of the organizer in these studies has influenced the amount of passage material recalled. The present study uses single statement narrative/expository advance organizers in an attempt to overcome the difficulty which could arise from having to hold a longer organizer in memory.

That this is a valid approach has been shown through several studies, some of which used single statement questions and some of which used main idea statements.

Doake (1972) in a study with teachers' college students investigated the effects of two kinds of questions on the learning and remembering of students during the reading of text material. In this study it was found that questions of both factual and reasoning

levels used as advance organizers provided greater retention of ideas and facts over time than when the same questions were given after reading.

Rickards and DiVesta (1974) conducted a similar study with college level students in which literal level questions were interspersed in text. It was found in this study that text material seemed to be rotely learned and little evidence of reader interaction with print was shown. A review of the literature on questioning by Andersen and Biddle (1975) further suggested that there was some difficulty with studies which employed questions as organizers, as most seemed to facilitate rote rather than meaningful learning of text. It was implied too that the literal level of questions used in studies could have been the determining factor in facilitating rote learning. Because of this ambiguity, however, it was decided to use statement advance organizers rather than questions in this study.

Rickards (1976) used single statement advance organizers in his study with college level readers. In this study with 75 students, Rickards compared the effects of five conditions on the reading recalls of college students. Two of these conditions used interspersed advance organizers, two used interspersed post organizers and one was a control condition. In an analysis of the reading recalls according to the system used by Howe (1970), it was found that interspersed advance organizer conditions produced greater recall of passage information than interspersed post organizers.

Further the results of this study suggested that single

statements of a concept at superordinate level were effective advance organizers. It was also argued that interspersion of advance organizers in text would facilitate subsumptive activity as outlined by Ausubel.

Since single statement advance organizers interspersed in text have been used in previous studies, this type of organizer and method of presentation of organizer were used in the present study.

The Influence of Interspersion of Organizers on Text Processing and Oral Recalls

If the subsumption process is indeed the way in which new information becomes recorded in memory, then it is logical to intersperse advance organizers in text. Each advance organizer pertains to the section which immediately follows and is an abstraction of the material there. If the reader is alerted to this abstraction or main idea, then it can be assimilated into long term memory. As the reader reads the following text paragraphs she will be able to select information which is most pertinent to the abstraction already held in memory. When the next advance organizer is presented, a similar process should occur so that the reader receives assistance in developing cognitive organization throughout the reading of the passage. If the reader were asked to recall material, the task should be relatively simple, for the main ideas of the passage would have been presented at points throughout the passage and the reader has been alerted to information which extended these. Since some readers have difficulty independently organizing unfamiliar material, it was decided to intersperse advance organizers in this study. Readers should then evidence some recall of the general level advance organizers

and the facts which expand upon those advance organizers.

Although many studies of advance organizers used multiple-choice tests as a measure of information recalled (Ausubel, 1960, 1961, 1962), it was felt that an indication of whether general ideas and facts related to them could be given best if oral recalls of material read were taken and analyzed. When oral recalls are used to glean information about what has been read, the information given should be "pure" in the sense that it is not influenced by a post organizer in the form of a test question. The influences on the oral recalls should be the advance organizer and the reader's own structuring of information. Therefore, in the present study oral recalls rather than multiple-choice tests were used to determine what the reader recalled from the passage.

The technique of using oral recalls from reading has been previously used by Rickards and August (1975), Rickards and DiVesta (1974) and Rickards (1976). These studies investigated the effects of advance organizers on the reading recalls of college level students. In these studies reading recalls were analysed by the method of meaningful text reduction initially developed by Cofer (1940) and modified by Howe (1970) and Rickards and DiVesta (1974). This method of analysis of recalls seemed to be an effective way to determine the influence of advance organizers on the reader's organization of information and was adopted for use in the present study.

Studies of Advance Organizers at the Junior High Level

Although there has been a great deal of research with advance organizers in general, few studies have been conducted with students

at the junior high level. Of those studies which have been conducted, half suggest that advance organizers do promote meaningful learning while others suggest the opposite or have non-significant results.

Allen's (1969) study with 212 ninth-grade students compared the use of advance and non-advance organizers in social studies material and used both immediate and delayed posttest. It was found that advance organizers enhanced learning for above average students but had no effect on less able students. Jerrolds (1967) developed advance organizers using Ausubel's model for use with a group of 8 ninth grade students reading social studies material and compared the performance of an advance organizer group with a modified organizer group and found no significant difference.

The 1967 study by Schulz, however, perhaps best capsulizes the state of research with advance organizers and junior high students.

In this study with 376 students, a group receiving advance organizers was compared with a group that did not receive organizers. Both groups were given science material to learn and were tested immediately after the treatment and were given a delayed posttest. Although no statistically significant differences were found, Schulz concluded that advance organizers were helpful when students lacked the processing skills necessary to organize information independently. Schulz based his conclusion on the fact that the differences between students receiving advance organizers and those not receiving the organizers approached significance. In addition, his personal observations of the students suggested that students receiving advance organizers seemed able to work better independently.

Barnes and Clauson (1975) in a review of the research on advance organizers indicated a need for further research at all grade and age levels. Because of the ambiguity of the results of studies of advance organizers conducted at the junior high level it was decided by the present writer to conduct a further study at this level.

In addition it is at the junior high level that students are expected increasingly to independently organize material that is read. Much of this material to be read is in content area subjects where new concepts are numerous, so that the junior high reader who has difficulty organizing finds it difficult to cope. Ausubel (1969) points out that advance organizers may be even more important to junior high students than adults, for their cognitive organization may contain fewer abstract concepts and higher-order abstractions. Advance organizers could be a key to developing the higher level concepts necessary for the students to develop an understanding of a particular passage or eventually of a total discipline. For these reasons it was decided to conduct this study with junior high school students.

Literature was chosen as the discipline for use in this study because it is an area with which many junior high students seem to have difficulty. At the junior high level, the literature program expands to include many different genres, and students often have problems coping with them and with changes in style of writing. In this researcher's opinion, this is particularly true of some types of expository material. It could be that the higher incidence of factual information, combined

with writing styles make this expository literature more difficult to read. Also since, as Eisner (1972) suggests, literature too is a field with its own hierarchy of knowledge which should be reflected in any single piece of work, advance organizers should aid students in their approach to this material. Therefore in the present study, narrative/expository English-literature material was selected as an appropriate medium to determine the effectiveness of advance organizers in aiding students to organize and recall material read.

Rationale for the Examination of Certain Sample Variables

Cognitive Processing

Because junior high school students are just entering the Piagetian stage of formal operations, their cognitive structuring may contain few abstract concepts and higher level abstractions (Ausubel, 1968). It becomes important therefore to consider the nature of the cognitive processing done by each student and to consider the kinds of life experiences which students may have had which could influence that cognitive processing.

Luria (1973) has suggested that there are essentially two types of cognitive processing done by individuals and that both types of processing may be done in a particular cognitive task. Successive processing integrates individual stimuli into a series so that information must be gathered an item at a time, then later drawn together to abstract an overriding concept. An example of this type of processing would be narrative speech. Simultaneous processing, on the other hand, involves the formation of a gestalt or idea of a total process

which includes an understanding of the relationships between elements of a set. Das and Cummins (1977) commented that in the reading process, successive processing may be important for the mastery of initial decoding skills but that higher levels of fluent reading may depend more on simultaneous processing. Since the superordinate advance organizer in this study is a statement of main idea, and the coordinate statement advance organizer is a repetition of text, it could be that those students who do more successive than simultaneous synthesizing would benefit more from superordinate advance organizers than would students who do more simultaneous than successive synthesizing. The students who were primarily successive synthesizers would be able to utilize the superordinate advance organizer as a framework for the other information processed during reading. In the present study a test was made of each student's cognitive processing using The Test of Clustering in Recall originally developed by Bousfield (1956). These scores were then correlated with the student's overall performance to determine whether the type of cognitive synthesis done did have an effect on performance.

Life Experience Factors

According to the Gestalt psychologists (Perkins, 1969), whatever is learned is learned in relation to total life experience. Further, if the derivative subsumption theory of meaningful learning is accepted (Ausubel, 1968), then past experiences will have a profound effect on new learning. It is difficult therefore to determine precisely what is learned because of a particular teaching method or what is learned because of an individual's previous experience.

However, it has been suggested (Broom and Selznick, 1969) that individuals with a similar socio-economic background would have had similar though not identical experiences. For the present study, therefore, students were selected whose socio-economic backgrounds were similar. Further the choice of eighth grade students ensured that most students had one year of academic experience in the same junior high school. The experience with a common academic program helped to control for differences arising from varying teaching methodologies.

Reading Achievement

Although research has suggested that it is not necessary to decode every word during the reading task, that in fact such an approach may be extremely inefficient in terms of reading comprehension (Smith, 1971), most theorists have suggested that comprehension is enhanced if the reader is familiar with the conventions of print and has established a reading vocabulary (Clay, 1972). Readers who have difficulty identifying words in context or who have not developed some basic reading comprehension skills are inevitably going to have problems when confronted with a lengthy passage of text. They may spend so much time in decoding that little content is comprehended Since immediate short term memory is overloaded with information. Similarly, readers unable to associate details, understand cause/effect relationships or abstract main ideas would have difficulty with reading. Since these reading factors would undoubtedly have an effect on readers, students in remedial reading classes were eliminated from the present study and the reading achievement of the study sample was

regarded as a factor which could possibly influence the study findings.

Reading Time

Rickards in his 1976 study with college level readers suggested that the time restriction which he had placed on reading time could have limited the development of subsumptive activity. Because of this and because the present researcher was concerned with the anxiety which could be imposed on junior high readers by a time-limited reading, no limit was placed on reading time in the present study. However, because reading time could have had an effect on the amount and kind of material recalled, a record was kept of reading times and this was examined in concert with the results of the study.

Verbal Intelligence

Several studies have indicated that there is a correlation between level of intelligence and reading ability (Goldberg, 1966). Further, it seemed logical to obtain a measure of verbal intelligence because an understanding of vocabulary and a facility with language could have an effect on the reading comprehension of students. Students whose verbal intelligence was low might have difficulty with reading comprehension simply because the language was too difficult. In addition, Ausubel in his studies suggested that advance organizers of a superordinate nature provided most benefit to those college level students who had low verbal ability. It could be that this would also be true for junior high level students. Since so few studies with advance organizers have been conducted at the junior high level, in the present study record was kept of verbal intelligence

and correlated with performance to determine if Ausubel's conclusions were also true at this level.

Summary

In this study reading is viewed as an active thinking process in which the reader relies on and applies all of his knowledge of language and the world as she attempts to reconstruct and expand upon the content of the message presented to her by the author. Since print is one way of transmitting knowledge, reading can also be seen as a way of gaining knowledge. Research suggests that knowledge has a structure and that if the learner or reader is to meaningfully learn material, she must develop a cognitive organization that reflects the structure, of knowledge. The theoretical views and research presented in this chapter suggest that advance organizers are one way of aiding the reader to develop a cognitive structure that would enhance meaningful learning. Presented interjected in text these advance organizers aid the reader in the processing of pertinent information. Because of the nature of the reading that is required in content area subjects at the junior high level, it seems that advance organizers may be an effective aid for these students. In this study therefore the use of advance organizers interspersed in text to facilitate junior high students' recall of information gleaned from reading was investigated.

Chapter III

THE DEVELOPMENT AND EXPERIMENTAL DESIGN OF THE STUDY

The design of the study will be discussed in this chapter. The chapter will also include a description of the student population and the sample, the selection of the reading passage, the writing of the organizers, the Test of Clustering in Recall, the treatment procedures and the statistical treatment of the data.

The Design of the Study

The purpose of this study was to investigate the effects of interspersed advance organizers on the reading recalls of eighth grade students representing a range of reading achievement of low to average to high comprehension. To achieve this purpose the study was conducted in three stages. The first stage involved the selection of an appropriate passage of narrative/expository English literature material and the writing of superordinate, coordinate and interjected advance organizers for this passage. The second step consisted of a pilot study to assess the extent to which advance organizers aided students in producing reading recalls and to assess the validity of the passage, method of recall analysis and of the data collection methods. The third and final stage involved the collection and analysis of the data. In both the second and third phases of the study, all student responses were transcribed from audiotape and analyzed both qualitatively and quantitatively.

The design essentially can be described as a single factor analysis of variance with four levels of treatment procedure. The four levels of treatment were the four advance organizer conditions. In addition correlations were completed to determine whether performance was significantly related to factors such as reading achievement, verbal intelligence score, synthesizing ability, language arts scores and reading time.

The Student Population and Samples

The population from which the research sample was chosen consisted of sixteen classes of eighth-grade students from two large urban junior high schools. These schools, identified by the school system as containing predominantly middle socio-economic class students, were assigned to the researcher by central office personnel from the school system in which the study was carried out. One of the schools containing eight eighth grade classes was designated by central office personnel for the pilot, and the other school, also with eight classes of grade eights, for the main study.

Sixteen students from a population of 200 in eight classes were selected from one school for the pilot study and 80 students from eight classes were selected from the population of 260 in the other school for the main study. Criteria for the selection of these students are discussed in the next section.

Selection of the Samples

Scores on the Stanford Reading Test administered in the spring of 1977 and obtained from students' cumulative records were used for both

pilot and main study. Students were selected so that proportionate numbers of high, average and low achieving readers participated in the study. For the main study, high readers were defined by the researcher as those achieving at or above the 85th percentile on both words and paragraph subtests of the test; average readers were those achieving between the 30th and 84th percentiles inclusive; and low readers were those achieving below the 30th percentile on both subtests. Five students whose first language was not English and sixteen who were in remedial reading classes were omitted from the sample. Once these reading achievement categories were established, students were randomly selected for both the pilot and the main study by choosing every fifth student, so that for the pilot study there were four high, eight average and four low readers selected and for the main study there were twenty high, forty average and twenty low readers selected with equal numbers of males and females in each category.

This student sample was then randomly assigned to four treatment groups so that each group in the main study had five high, ten average and five low readers and that there were equal numbers of males and females. The four groups are outlined below.

Treatment Group 1: The Superordinate Interjected Advance Organizer Group

These students were asked to read the test passage containing superordinate advance organizers interjected before the first two paragraphs and before each of the following two-paragraph segments and before the final single-paragraph segment.

Treatment Group 2: The Coordinate Interjected Advance Organizer Group

These students were asked to read the test passage containing coordinate advance organizers interjected as described for Treatment Group 1.

Control Group 1: The Interjected Statement Group

These students were asked to read the test passage containing statements interjected as described for Treatment Group 1.

Control Group 2: The Uninterrupted Reading Group

These students were asked to read the test passage which was divided into two-paragraph segments but which did not have any interjected statements or organizers between each segment.

Control of Sample Variables

An attempt was made to control for language and verbal intelligence because the research cited in Chapter II indicated that these variables could have an influence on student performance in a reading task.

All subjects selected for the study spoke English as a first language and did not manifest any language difficulties to the researcher during the interview. Those students who were involved in remedial reading classes were also omitted from the sample in an attempt to control for possible difficulties with word identification. Information related to intelligence was obtained from the students' performance in 1976 on the Canadian Lorge-Thorndike Intelligence Tests, Non Verbal and Verbal Batteries, Form A, the scores of which were entered on students' cumulative record cards. All of the 200 students

who scored 85 or above on both the verbal and non verbal subtests were considered to comprise the population from which the final sample of eighty was drawn. Scores ranging from 92 to 108 are considered by the authors to be average, while a score above 108 is above average and below 92 is below average (Lorge, Thorndike and Hagen, 1967).

In this study students in the average, above average and below average range were proportionately distributed across groups (Table 3.1). The mean scores of each group for the verbal and non verbal subtests respectively were as follows:

1. Treatment Group 1 had a mean verbal score of 105 and a mean non verbal score of 110.95.

2. Treatment Group 2 had a mean verbal score of 105.3 and a mean non verbal score of 108.95.

3. Control Group 1 had a mean verbal score of 107.05 and a mean non verbal score of 109.05.

4. Control Group 2 had a mean verbal score of 106.85 and a mean non verbal score of 110.4.

Since an analysis of variance of the verbal scores revealed no significant difference at the .05 level, $F(3,76) = 2.74$, the groups can be regarded as homogeneous in terms of intelligence scores on the verbal scale (Table 3.2).

In addition a further analysis of variance of mean scores on the Reading Words and Paragraphs subtests of the Stanford Reading Achievement Test suggested that no significant differences at the .05 level, $F(3,76) = 2.74$, between groups existed (Tables 3.3, 3.4). However, slight advantages in reading achievement were noted for the

Table 3.1

Summary of Treatment Group Variables: Main Study

Treatment Groups	Mean Scores							
	Reading Words	Reading Paragraphs	Verbal Intelligence	Non Verbal Intelligence	Language Arts	Synthesis	Reading Time (min.)	Sex
Treatment Group 1	60.30	58.95	105.00	110.95	64.45	.6084	8.3	10F 10M
Treatment Group 2	56.75	57.00	105.30	108.95	62.10	.58815	8.7	10F 10M
Control Group 1	66.05	62.30	107.05	109.05	61.50	.5759	7.8	10F 10M
Control Group 2	60.10	64.60	106.85	110.40	62.80	.5884	8.05	10F 10M

Table 3.2

Analysis of Variance: Differences in Means of Scores on Verbal Intelligence

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-ratio	Probability
Groups	.6600	22.00	3	0.15	0.927
Error	.1097	144.47	76		

$F_{.95}(3,76) = 2.74$

Table 3.3

Analysis of Variance: Differences in Means of Scores on Reading Words

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-ratio	Probability
Groups	.8940	298.0	3	0.38	0.76
Error	.5886	774.5	76		

$F_{.95}(3,76) = 2.76$

Table 3.4

Analysis of Variance: Differences in Means of Scores on Reading Paragraphs

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-ratio	Probability
Groups	.6305	210.17	3		
				0.28	0.83
Error	.5655	744.19	76		

$F_{.95}(3,76) = 2.76$

control groups. Overall, however, the groups were considered homogeneous in terms of reading achievement and intelligence.

A similar analysis of variance of scores from the Test of Clustering in Recall showed no significant differences between groups at the .05 level, $F(3,76) = 2.76$ (Table 3.5). It seemed therefore that the groups could be also considered homogeneous in terms of this variable.

Selection of the Reading Passage

Because in most research studies involving advance organizers the reading material tended to have a high number of facts and was expository in nature (Ausubel, 1968), it was decided to limit passage selection to material of this type. Many previous studies involved reading material from one of the scientific disciplines, but it was decided for this study to use narrative-expository English literature material because material of this type was familiar to the researcher and it is an area in which advance organizers have not previously been used.

Narrative/expository English literature material of a biographical nature was selected because it offered an appropriate combination of human interest and factual level material. Texts recommended for use by Alberta schools were examined to determine the type of material that junior high school students were expected to read (Secondary Language Arts Handbook, 1972). Once this was done, a list of this type of material, both recommended and supplementary texts, was developed. From this list the researcher sought a passage that met the following criteria: (i) the passage was a self contained unit, that is, it had

Table 3.5

Analysis of Variance: Differences in Means of Scores on The Test of Clustering in Recall

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-ratio	Probability
Groups	.3701	1.8971	3	.151	.923
Error	.2430	1.3938	76		

$F_{.95}(3,76) = 2.76$

a recognizable beginning, middle and end; (ii) the average readability level of the passage as determined by the Dale-Chall (1948) readability formula had to be grade 8.0 to control for possible problems with material that was too difficult. (The Dale-Chall formula which involves a count of words and sentence length to compute text difficulty was judged by Klare (1975) to be an adequate measure of readability); (iii) the passage had to have an appropriate balance between human interest and factual material; (iv) the passage had to be of a realistic length in order to give the organizers an opportunity to function and to alleviate difficulties caused by a too lengthy reading time.

The passage finally selected was from Non Fiction II and was about Louis Slotin, a Canadian scientist who worked with the atomic bomb (Appendix C). This passage of 1,025 words met the criteria listed above and had a mean readability level of grade 8.0. The paragraph units fit together in logical sequence with each paragraph extending the information given about Slotin. In addition, the focus on scientific factual material in the middle paragraphs made this passage a realistic one in terms of the types of material eighth grade students are asked to read regularly.

Because of the nature of the passage in terms of readability level and the story content, it was determined a valid choice for use in this study. In addition, the writing style, since it is of a narrative/expository nature, resembles that of other passages used in studies involving advance organizers. Therefore, content validity of the

passage used in the present study is claimed.

Once the passage was selected and deemed valid for use in the study, superordinate and coordinate advance organizers were written and selected in the manner outlined below.

Writing and Selection of Advance Organizers

Superordinate Advance Organizers

Two single statements of the main ideas of the first, third, fifth, seventh, ninth, eleventh, thirteenth and fifteenth paragraphs were written. Copies of the text passage and the organizers were given to three judges, one a junior high school teacher, another an undergraduate education student who had taken courses in reading, and the third a psychologist with a Master of Education in psychology. These judges independently selected the single statement organizer which they thought best represented the main ideas of paragraphs in the passage. Record was kept of choices of organizers and it was decided that those statements which were selected by two of the three judges would be used in the study.

Coordinate Advance Organizers

After the superordinate advance organizers had been determined, the first, third, fifth, seventh, ninth, eleventh, thirteenth and fifteenth paragraphs were re-examined by the researcher and a sentence selected from each which did not seem to be a statement of main idea. The same three independent judges were asked to determine whether these sentences contained main idea statements. In all cases judges agreed that the statement selected did not convey main idea information.

This high level of agreement suggested that the sentences selected did not contain main idea information and were therefore different from the superordinate statement organizers.

Organization of Passage Segments and Organizers

The passage was typed on 210 x 270 mm (8 x 11 inch) paper so that two paragraphs appeared on each page (Appendix A) except the last page where only a single paragraph was typed. Four copies were made of the passage. The first copy of the passage was ordered so that appropriate superordinate advance organizers appeared before each text segment and was stapled so that each student received a complete package. The students in Treatment Group 1 then received a passage ordered as follows: superordinate advance organizer, two-paragraph segment, superordinate advance organizer, two-paragraph segment and so on until the final segment which was a superordinate advance organizer, single paragraph segment (Appendix A).

The second copy of the passage was ordered in the same manner except that coordinate statement advance organizers replaced superordinate statement advance organizers. The third copy of the passage was again ordered in the same manner but organizers were replaced by statements such as "This is segment one. This is segment two." The fourth copy of the passage was simply collated and stapled with no insertion of extra pages.

Collection and Analysis of Data

The following section details the method of collection and analysis of oral recalls as well as describing the administration and scoring of the Test of Clustering in Recall.

Collection and Analysis of Reading Recalls

Students were given one of the four passages to read. They were given the following instructions: "Here is a passage for you to read. You may have all the time you need but you may not turn back a page once it has been read. When you have finished reading, I want you to tell me about the story and I shall record what you say. Do you have any questions about what you are to do?"

It should be noted that although students had unlimited reading time, record was kept of it. Recalls were recorded on a Sanyo cassette tape-recorder and later transcribed for analysis.

The procedure for analysis of recalls was based on one originally developed by Cofer (1941), later used by Howe (1970), and Rickards (1976), Rickards and August (1975) and Rickards and Di Vesta (1974). For scoring the accuracy of reproduction of meaningful components of the material of the 1,025-word passage, it was divided into fifteen segments, each of which was judged to have content that contributed meaningfully to the passage. The important content or main idea of each segment was reduced to a phrase of around two or three words and segments were scored correct if the meaningful content was judged to have been reproduced. To facilitate reliable scoring, written guidelines were provided giving examples of acceptable

versions. For instance in the first paragraph the main idea was judged to be "Louis Slotin was a brilliant young scientist" and the scoring instructions specified that to be scored correct the reproduction had to be the equivalent of "Slotin was in science."

In determining whether facts were recalled a similar procedure was used. In the first paragraph items such as "Slotin entered university at fifteen. He was born in Manitoba" were judged to be facts which contributed to the development of the main idea.

A measure of reliability was provided by correlating the meaningful recall scores as measured by two independent judges. One of these judges was a junior high school teacher with a background in reading methodology; the other was a third year undergraduate student in the Bachelor of Education program at the University of Calgary who has taken some reading courses. These judges independently scored a random sample of half of the total number of free recall protocols. The Pearson-product moment correlation for the total number of facts recalled was .90 and for the total number of main ideas recalled was .85. These correlations were similar to those obtained in previous studies which used the same scoring procedure and correlational analysis (Rickards, 1976; Rickards and Di Vesta, 1974). The correlations were of sufficient magnitude to suggest that the measures employed were suitably objective.

The Test of Clustering in Recall

This was used to determine the strategy used by students in synthesizing verbal materials. The data obtained from this test made it possible to evaluate the simultaneous synthesizing ability of each

student.

The test as used in this study was the adaptation used by Latham (1973) of the Bousfield Test of Clustering in Recall of randomly arranged associates. The assumptions underlying Bousfield's and Latham's study was that clustering was a consequence of organization in thinking and recall and that it would provide additional information on the nature of organization of the higher mental processes.

The variation of the test used by this researcher was the same as that used by Latham (1973). Students were presented with a list of nouns printed each on a separate 25 cm x 8 cm card. The list was displayed to students at the rate of three seconds per word. Three seconds after the last word had been displayed, students were asked to write down as many words as they could recall. They were provided with sheets of paper which required the writing of words in columns. Students were given ten minutes to recall the list and were requested to draw a horizontal line to mark the end of each minute. Although there could have been a distraction caused by the line drawing task, in actual practice the distraction was minimal and did not seem to affect results.

Of the two scores possible from this test, only one, Bousfield's Ratio of Repetition, was used for this study. This score (RR) is computed from the number of words recalled in clusters and the total number of words recalled. The formula for deriving this score is $RR = \frac{R}{N-1}$ where R is the number of words recalled in clusters and N is the total number of words correctly recalled. The R score is

derived by adding all of the words correctly recalled from a single category which follow consecutively, subtracting one and summing all such scores.

Statistical Analyses of Data

To measure the effectiveness of treatment a one-way analysis of variance was employed to test between group variance. Significance at the probability level of .05 was used as allowing acceptance of the null hypotheses. Correlations were completed to determine whether there were significant interaction effects among population variables and treatment effects existing.

The Pilot Study

The purpose of the pilot study was to:

1. Test and assess the clarity and completeness of the instructions presented before the passage.

2. Obtain an indication of the time required to administer the Test of Clustering in Recall, have students read the passages and collect recalls.

3. Determine the appropriateness of the passage and the use of oral recalls.

4. Determine whether data analysis procedures would be effective.

5. Discover whether the organizers functioned as research suggested.

Sixteen students from a population of 200 in eight eighth grade classes from one school were selected after an examination of

cumulative record cards. Selection procedures were as described previously in this chapter. Students were assigned to groups and data collected and analyzed as described for the main study.

As a result of the pilot study, a number of adjustments and changes were made:

1. The range of reading achievement scores used in the study was modified to include students below the 30th percentile. This was done because the researcher noted that there was too little differentiation between reading achievement groups in the pilot study (Table 3.6). From this table it can be seen that the reading achievement scores of these students were clustered around the upper percentiles as measured by the Stanford Reading Achievement Test. Because of this it was felt that performance on the experimental task would be more reflective of the reading achievement of the students than of the effects of the advance organizers. In addition studies by Ausubel (1968) and Schulz (1967) have not given a definite indication of the reading achievement groups with which advance organizers were most effective. Since the present study used advance organizers at the junior high level and few studies have done this, it was felt that a more representative sample of reading achievement was necessary.

2. Instructions were modified to exclude the word "remember" as some students felt that "I want you to tell me everything you can remember about the story" indicated that they were to memorize the passage.

Table 3.6

Summary of Treatment Group Variables: Pilot Study

Treatment Groups	Mean Scores							
	Reading Words	Reading Paragraphs	Verbal Intelligence	Non Verbal Intelligence	Language Arts	Synthesis	Reading Time (min.)	Sex
Treatment Group 1	62.3	64.2	106.1	105.6	67.1	.5831	7.4	2F 2M
Treatment Group 2	65.0	60.9	107.2	103.2	72.3	.5423	8.2	2F 2M
Control Group 1	61.2	59.7	103.5	105.7	69.5	.5734	7.2	2F 2M
Control Group 2	63.4	62.7	105.9	103.8	68.9	.5524	7.4	2F 2M

Summary

This chapter detailed the design of the study and the selection of the samples for both pilot and main studies. The selection of the passage and writing of organizers was outlined as was the method of statistical analysis selected for the study.

Chapter IV

FINDINGS AND DISCUSSION OF THE STUDY

This chapter will present a brief discussion of the assumptions of the analysis of variance and the way in which the present data meet these assumptions. This will be followed by the presentation of the findings in direct relation to the null hypotheses generated from the research questions of Chapter I and a discussion of these findings. The final section of the chapter will discuss the correlations of factors considered to have a possible significance for the present study.

To investigate the effects of advance organizers, both superordinate and coordinate statements interjected within a fifteen-paragraph text, on the content of the reading recalls of eighth grade readers, the advance organizers on the reading recalls were examined through the number and position of main ideas recalled and through the number and position of facts supporting main ideas recalled from the fifteen-paragraph passage.

Assumptions Underlying the Analysis of Variance

Ferguson (1971) suggests that the following assumptions are made when an analysis of variance is carried out:

1. The distribution of the dependent variable in the population from which the samples are drawn is normal.

In the present study, since students were randomly selected

and assigned to groups and since students in each group represented a range of reading ability, it was assumed that the distribution of the dependent variable was normal. Therefore, conclusions drawn from the data should be valid.

2. The variances in the population from which samples are drawn are equal.

Tests of homogeneity of variance could be applied to the data to determine whether variances were equal. Ferguson (1971) also suggested that moderate departures from homogeneity would not seriously affect inferences drawn from the data. Since in the present study there were no serious departures from homogeneity, it was assumed that this condition had been met.

3. The effects of variance factors on the total variation are additive.

Ferguson (1971) suggested that in most cases there were no grounds to suspect the validity of this model; therefore it was assumed that this condition was met in the present study.

Because these three major assumptions appeared to be met in the present study, and Ferguson (1971) suggested that in any set of data these assumptions are at best only roughly satisfied, it is assumed that the conclusions drawn from the analysis of variance computed for this study were valid.

Findings Related to Null Hypotheses

Null Hypothesis 1

There will be no significant difference between treatment groups in the mean number of main ideas recalled from first paragraphs of two-paragraph text segments.

Figure 4.1 presents the total number of main ideas recalled from the first paragraphs of the two paragraph text segments by each group. When converted to percentages, these totals reveal that Treatment Group 1 recalled 58.8 percent of the main ideas in the first paragraph segments, Treatment Group 2 recalled 36.9 percent of the main ideas in these segments, Control Group 1 recalled 35.6 percent of the main ideas and Control Group 2 recalled 34.4 percent of the main ideas. Although Informal Reading Inventories suggest that adequate comprehension of a passage is not attained unless readers evidence understanding of 75 percent of the passage, it could be argued that in the reading inventory situation students have questions available which provide a frame for their recall. In this unaided recall situation, however, students were not given the assistance of questions so that a more valid picture of their own structuring of the passage would emerge. It seemed unrealistic to expect that 75 percent recall would be obtained when unaided recalls were used, thus the reported levels of recall were accepted and since the results were all obtained in the same manner, they were examined comparatively.

An examination of the mean scores (Figure 4.2) showed that students in Treatment Group 1 recalled a higher mean number of main ideas from first paragraph segments than any other group. Table 4.1

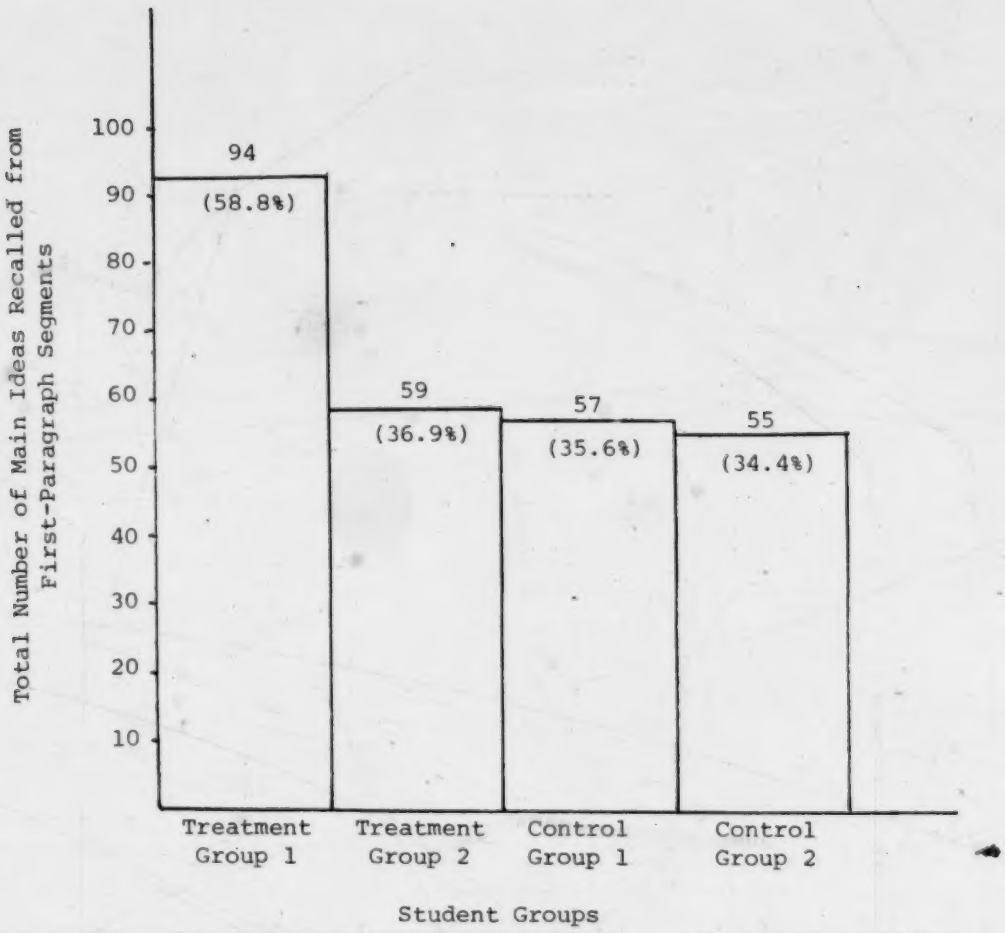

Figure 4.1

Total Number of Main Ideas Recalled from First-Paragraph Segments by Each Group

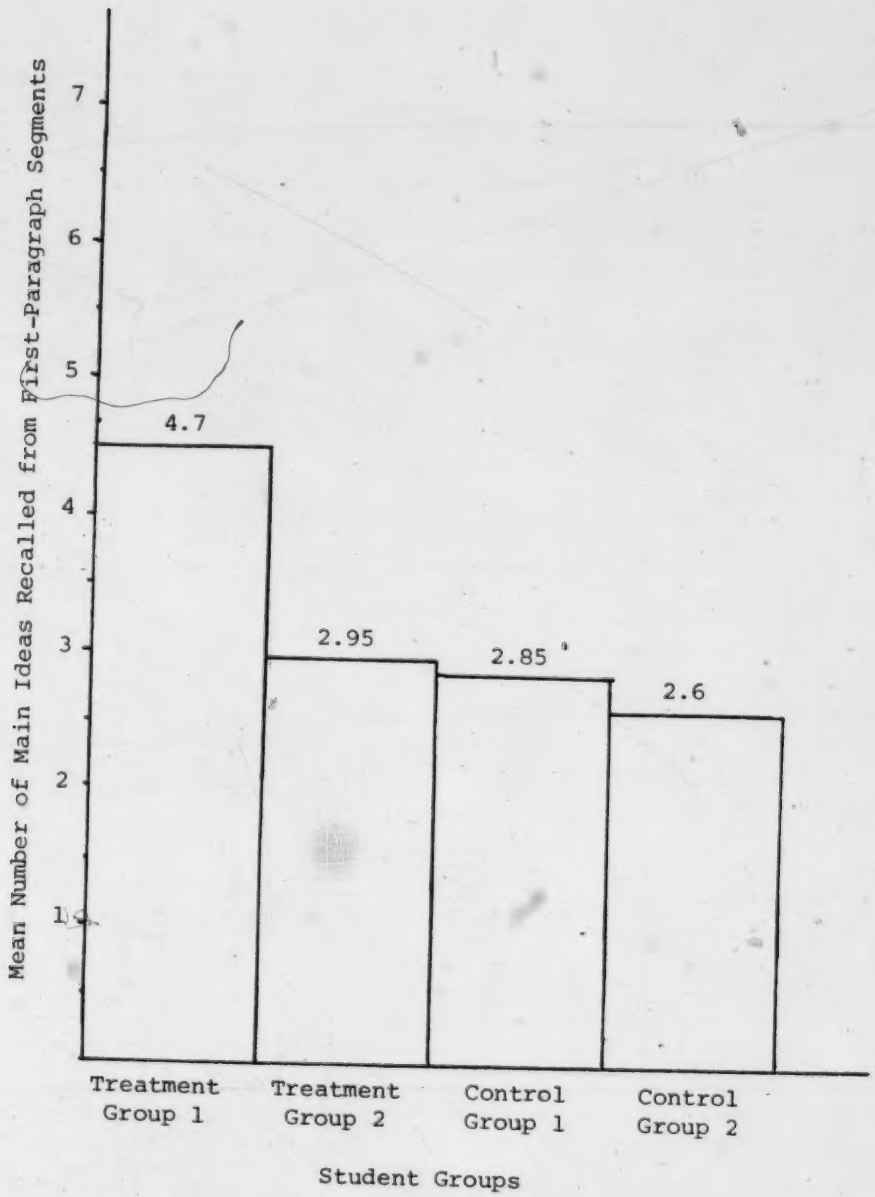

Figure 4.2

Mean Number of Main Ideas Recalled from First-Paragraph Segments

Table 4.1

Analysis of Variance: Number of Main Ideas Recalled from First-Paragraph Segments

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-Ratio	Probability
Between Groups	.51737	17.25	3	10.79	.000007
Error	.12145	1.60	76		

$F_{.95}(3,76) = 2.76$

presents the summary of the analysis of variance on this set of data. From this it can be seen that significant differences existed between Treatment Group 1 (the superordinate advance organizer group) and Treatment Group 2 and both Control Groups. The effect of the treatments on the recall of the mean number of main ideas from first paragraph segments was significant, $F(3,76) = 2.76$, $p < .001$. A further analysis of this data using the Newman-Keuls procedure of comparing ordered means suggested that significant differences existed between Treatment Group 1 and each of Treatment Group 2 and both Control Groups.

These findings tend to support the theory that advance organizers of a superordinate nature facilitate greater recall of main ideas than do coordinate advance organizers, interjected statements or uninterrupted reading. Given the nature of memory as outlined previously in this study and Ausubel's (1968) theory of derivative subsumption, the results of the present study relating to the main ideas recalled from first-paragraph segments were not surprising. Students in Treatment Group 1 had been given the main ideas of each first-paragraph segment in the superordinate advance organizer. Therefore, the students in this group were alerted to the main ideas of each of these segments before reading them. This main idea statement would then be held briefly in short term memory as students read further to obtain details relating to or supporting that main idea. As subsequent details were read, the initial main idea statement would be reinforced and ultimately retained in long term memory. When asked to recall the passage, students would then have ready access to these main idea statements and would be able to use them to help

recall the whole passage.

The operation of this kind of abstractive process is further supported by the failure of Treatment Group 2 to exhibit significantly different performance from either of the Control Groups. Given the nature of the coordinate advance organizer, it could have been that this advance organizer actually interfered with the operation of the subsumptive process. Students in this group read selected text sentences twice as they read the passage and this may have confused any attempts at their own unaided organization of text material. Once the coordinate advance organizer was read, it too may have been held in short term memory, but since few of the subsequent details were directly related to it, it may have not been reinforced in memory and would not therefore be as likely to be reproduced.

The similarity of the results between Treatment Group 2 and the two Control Groups also suggested that in these groups it could have been the students' independent organization and recall of information that was operative in the oral recalls in the testing of Null Hypothesis 1. It seemed also that the interjection of control statements had no significant effect on the students' organization and recall of main idea information.

Although it could be argued that the recalls of students in Treatment Group 1 also reflected their independent organization of passage material, the greater average number of main ideas recalled from first-paragraph text segments suggested that the superordinate advance organizers were having an effect on the recalls of passage material.

This finding supported Biggs' (1971) suggestion that readers given coordinate statements as advance organizers processed text rotely. The recalls of these readers then would be stored in a form similar to that in which it was presented initially. This would in turn make recall of passage information more difficult as readers would have no overriding concepts stored in memory to facilitate recall. Like literal level questions, statements of a coordinate nature tend to lead to rote learning of a text and to attending only to specific factual information (Anderson and Biddle, 1975). Superordinate statements on the other hand seem to cause readers to attend more to relationships between sentences within a paragraph and may indeed cause readers to become more actively involved in the processing of text material. That this seems to be the case was supported by the results of the present study which were related to Research Hypothesis 2.

Null Hypothesis 2

There will be no significant difference between groups in the mean number of main ideas recalled from second paragraphs of two-paragraph text segments.

Figure 4.3 presents the total number of main ideas recalled from the second paragraphs of two paragraph text segments by each group. When converted to percentages, these totals reveal that Treatment Group 1 recalled 37.1 percent of the main ideas in the second paragraph text segments, Treatment Group 2 recalled 14.3 percent of the main ideas in these segments, Control Group 1 recalled 18.6 percent of the main ideas and Control Group 2 recalled 19.3 percent of

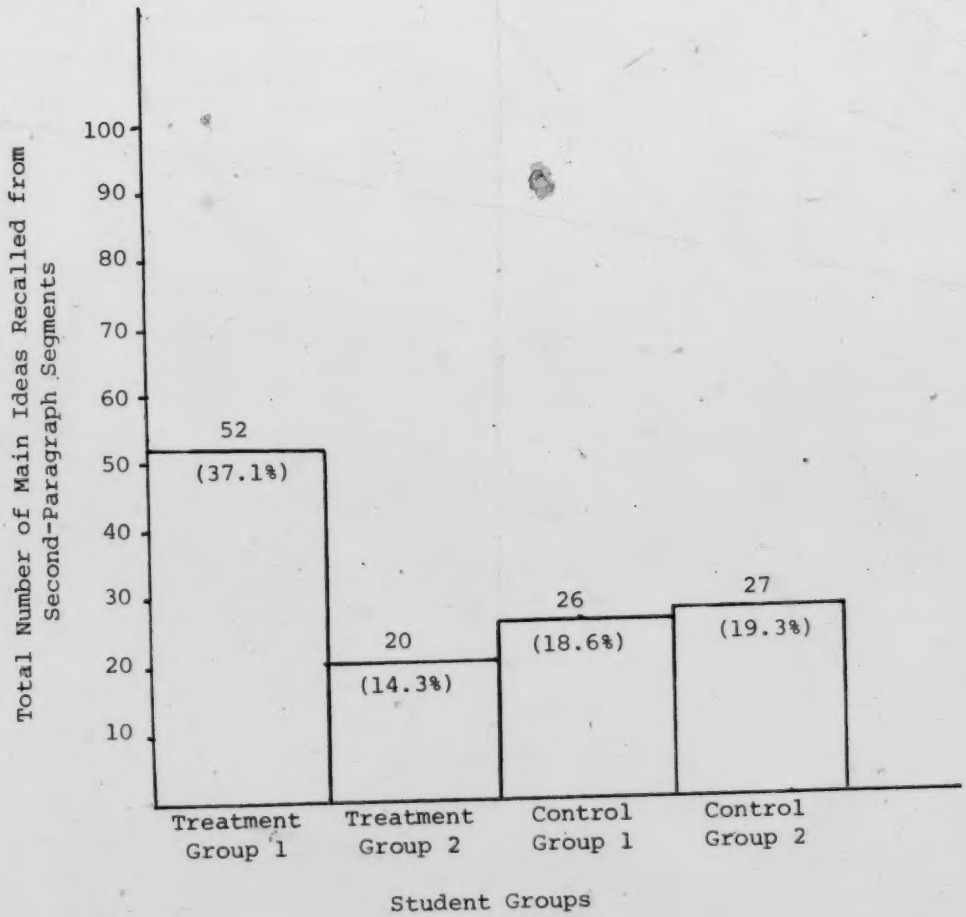

Figure 4.3

Total Number of Main Ideas Recalled from Second-Paragraph Segments by Each Group

the main ideas. Once again these percentages were somewhat lower than would be expected if students had been given the assistance of questions to help with questions. The lowered percentages for these second paragraph units also suggested that the position of the paragraphs on the page could have influenced recalls of students. However because differences were noted between groups a comparison of group performance was carried out in an attempt to determine the selected effects of the varying treatments.

An examination of the mean number of main ideas recalled from second paragraph segments showed that the superordinate advance organizer group recalled a greater mean number of main ideas (Figure 4.4). The effect of the treatments on the recall of the mean number of main ideas from second paragraph text segments was significant, $F(3,76) = 2.76$, $p < .05$ (Table 4.2). A further analysis of this data using the Newman-Keuls procedure of comparing ordered means suggested that significant differences existed between Treatment Group 1 and each of Treatment Group 2 and the Control Groups. No significant difference was noted in the mean number of main ideas recalled from second paragraph units between Treatment Group 2 and either of the Control Groups or between the two Control Groups. It seemed therefore, that superordinate advance organizers did produce greater recall of main ideas from second paragraphs of two paragraph text segments than coordinate advance organizers, interjected control statements or uninterrupted reading.

This finding suggested that students given superordinate advance organizers for first paragraphs of two-paragraph text segments

Table 4.2

Analysis of Variance: Number of Main Ideas Recalled from Second-Paragraph Text Segments

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-Ratio	Probability
Between Groups	.3959	13.20	3	9.68	.00001
Error	.1036	1.36	76		

$F_{.95}(3,76) = 2.76$

were able to use this to help to organize independently the second paragraphs of the two-paragraph text segments. That is, given the main ideas of the first paragraph, students could select details pertinent to the main ideas of second paragraph text segments. These details then could provide reinforcement of main ideas in the second paragraphs and could be subsumed under them and the main ideas better recalled later. Since students had been given the main ideas of the first paragraph segments, they could be alerted to the kind of information to be abstracted as main ideas from second paragraph segments. This then could enable them to more efficiently and independently abstract the main ideas from second paragraph segments. Details related to these independently abstracted main ideas could again be subsumed under the major theme of the passage. That this could be the operation which was occurring seemed to be supported by the significant difference in performance between the superordinate advance organizer group and the coordinate advance organizer group and the control groups. Only the superordinate advance organizer group produced significantly more recall of main ideas from second paragraph text segments. The provision of the main idea statement for the first paragraph segments did seem to aid students in abstracting and recalling main ideas from second paragraph segments. Therefore, it seemed that superordinate advance organizers did aid students in the independent organization of text material from second paragraph segments.

The use of coordinate advance organizers, however, may have interfered with the students' independent organization of second

paragraph text material thus resulting in a recall of fewer main ideas from second paragraph segments by the students in this group than by either of the controls. Students in the coordinate advance organizer group were alerted to a sentence from first paragraph segments which contained facts relating to the main idea of that segment. Since the main idea of paragraph two was not given in this organizer condition, students may have attended only to information related to the first paragraph segments. This could then have inhibited the independent abstraction of main ideas or facts from the second paragraph. Alternately those students in the control groups were not alerted to attending more to any text segment. The performance of students in the two control groups in the recall of main ideas could then have been better than that of Treatment Group 2. As can be seen from Figure 4.4 this could have been the factor operating here. The differences were not significant statistically but perhaps with a larger sample and recalls taken at a later time the effects would be more noticeable.

That delayed recalls may have produced somewhat different results was demonstrated in Doake's (1972) study which examined the use of reasoning and factual level questions administered before and after the reading of a passage on the learning and remembering of college level students. In this study Doake found that factual level questions presented before reading resulted in poor immediate recall of passage materials and that reasoning questions presented before reading facilitated long term retention of ideas and facts rather than short term recall. Although it was possible that the results

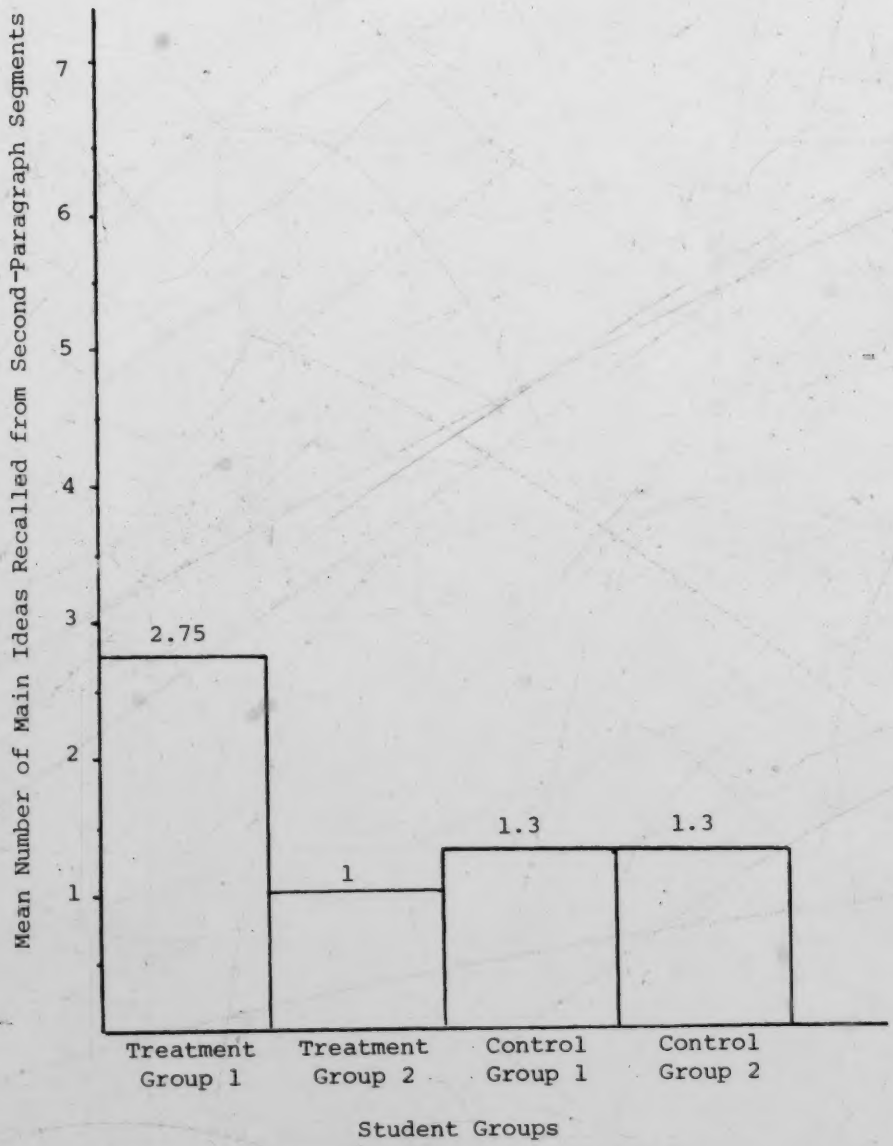

Figure 4.4

Mean Number of Main Ideas Recalled from Second-Paragraph Segments

of this study were due to the use of questions rather than statements as advance organizers, Rickards (1976) and Ausubel (1968) have suggested that the most significant factor was not whether the organizers were statements or questions but the level at which the organizer was written. Assuming this could be the case, the findings of Doake's study can be related to those of the present study.

The findings of the present study related to the recall of main ideas from second paragraph text segments were further supported by those of Rickard's (1976) study with college level readers. Like the present study, Rickard's study suggested that groups receiving advance organizers of a superordinate nature did produce more recall of concepts derivable from paragraphs treating different topics of the passage than those contained in the advance organizers.

Null Hypothesis 3

There will be no significant difference between groups in the mean number of facts recalled from first paragraphs of two-paragraph text segments.

Figure 4.5 presents the total number of facts recalled from the first paragraphs of two-paragraph text segments by each group. When converted to percentages, these totals reveal that Treatment Group 1 recalled 19.5 percent of the facts in the first paragraph text segments, Treatment Group 2 recalled 10.0 percent of the facts in these segments, Control Group 1 recalled 15.3 percent of the facts and Control Group 2 recalled 12.8 percent of the facts.

Although the percentages of facts recalled for all groups were quite low it could be that more facts would have been recalled had

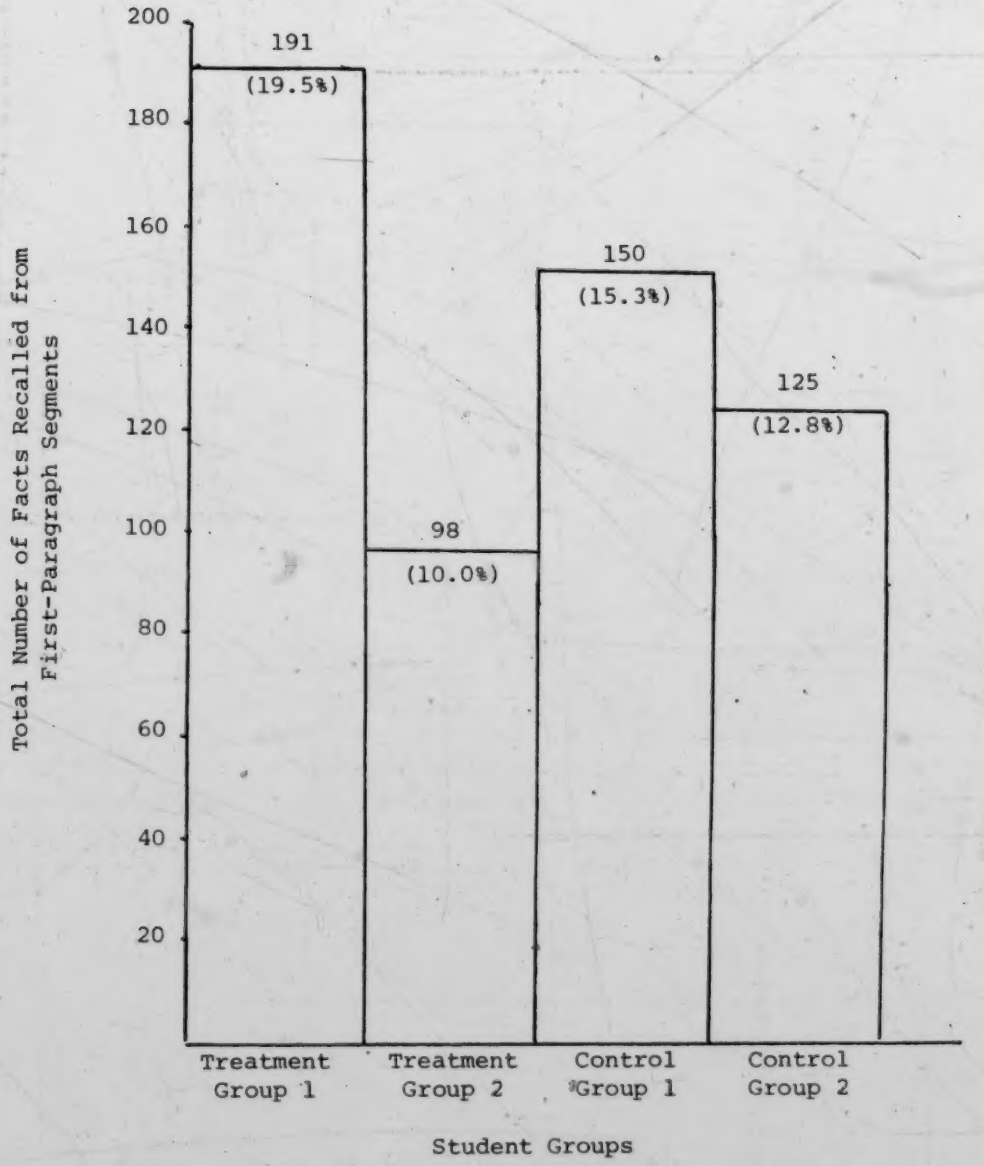

Figure 4.5

Total Number of Facts Recalled from First-Paragraph Segments

students had an indication of the type of information to report. Many students could have reflected in their oral recalls a reluctance to take the risk of reporting "wrong" information. This could suggest that had the students been given a series of questions after the oral recalls, the percentages of factual information reported would have been increased. However, it seemed significant that the superordinate advance organizer group did evidence a greater recall of facts from first paragraph segments than did Treatment Group 2 or either of the Control Groups. This suggested that even with the limitations of oral recalls the superordinate advance organizers aided recall of factual information.

Figure 4.6 presents the mean number of facts recalled by each group from first paragraph segments. An analysis of variance of these means suggested that the effect of treatment was significant, $F(3,76) = 2.76$, $p < .05$ (Table 4.3). It seemed therefore that Null Hypothesis 3 could be rejected.

A Newman Keuls procedure was used to compare ordered means and significant differences were found between Treatment Group 1 and each of Treatment Group 2 and both of the Control Groups. No significant differences were found between Treatment Group 2 and either of the Control Groups. It seemed, therefore, that superordinate advance organizers produced significantly more facts recalled from first paragraphs of two-paragraph text segments than coordinate advance organizers, interjected control statements or uninterrupted reading.

Since students in Treatment Group 1 were given the main ideas of the first paragraph segments in the superordinate advance organizer,

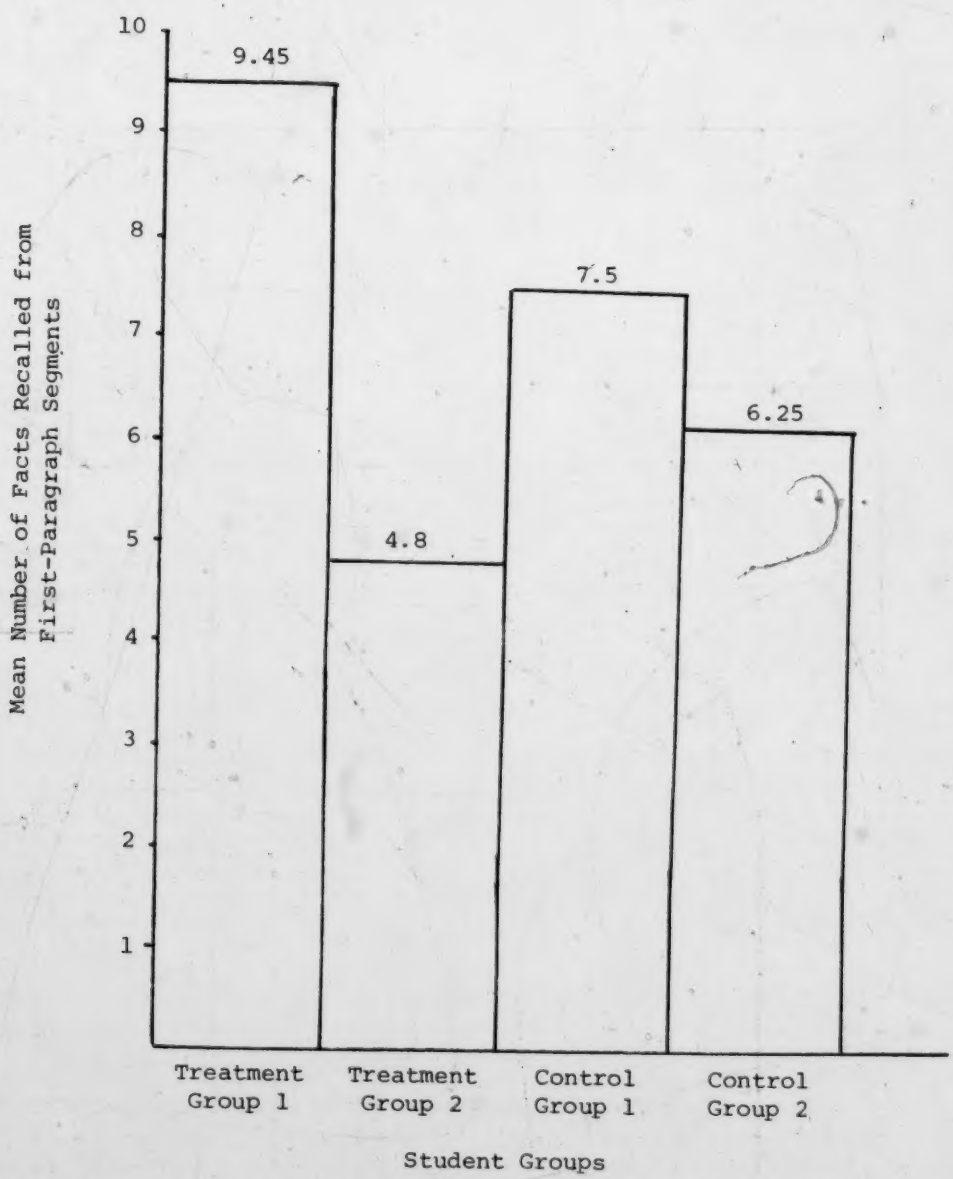

Figure 4.6

Mean Number of Facts Recalled
from First-Paragraph Segments

Table 4.3

Analysis of Variance: Mean Number of Facts Recalled from First-Paragraph Segments

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-Ratio	Probability
Groups	.2244	74.82	3	5.2	<.002
Error	.1075	14.15	76		

$F_{.95}(3,76) = 2.76$

it could have been that these students were better able to distinguish facts which related to the main idea. Since the passage itself would contain a logical meaning and organization, the superordinate advance organizers would have given clues to that logical meaning and organization. These clues would have aided students to establish their own meaningful learning sets (Ausubel, 1964) and subsume relevant details under each of these sets. Since only immediate recalls were requested of the students the details relating to the main ideas would remain distinguishable and could be readily retrieved. When given a superordinate advance organizer the students were aided to go beyond literal level comprehension and could begin to develop an ordering of passage structure which facilitated recall of factual passage material.

Although no statistically significant differences were noted between Treatment Group 2 and either of the controls, it is interesting to speculate about the possible causes for the lowered mean of Treatment Group 2. Several theorists have suggested differences between meaningful and rote learning and memory (Ausubel, 1968) and have indicated that there were different ways of retention involved in each task. In meaningful learning and memory, the individual could arrange her cognitive structure so that there exists a correspondence between that structure and the structure of the material to be learned. In rote learning, however, this interaction between cognitive structure and the structure of the material to be learned or read does not take place. Ausubel (1968) went on to suggest that if rote learning were occurring, information would be incorporated into the cognitive set as self-contained entities isolated from the learner's established

conceptual systems and from other related material.

In the present study, the repetition of a sentence from the first paragraph segments in the Treatment Group 2 condition could have caused the readers to regard this information as the information to be recalled. They might then not have attended as well to the related information contained within the paragraph for the task would be perceived as a rote learning one. There would be less spontaneous cognitive interaction with print and students would recall fewer details from these paragraphs. The control groups, however, were not faced with this interference and the organization imposed on the print to help them remember passage details would tend to be reflective of their own cognitive structuring.

It could have been too that the effects of the coordinate advance organizers in causing Treatment Group 2 to regard the task as a rote learning one were carried over to the second paragraph segments, for as can be seen in the discussion below similar effects were noted.

Null Hypothesis 4

There will be no significant difference between groups in the mean number of facts recalled from the second paragraphs of two-paragraph text segments.

Figure 4.7 presents the total number of facts recalled from the second paragraphs of two-paragraph text segments by each group. When converted to percentages, these totals reveal that Treatment Group 1 recalled 14.9 percent of the facts in the second paragraph text segments, Treatment Group 2 recalled 9.0 percent of the facts in

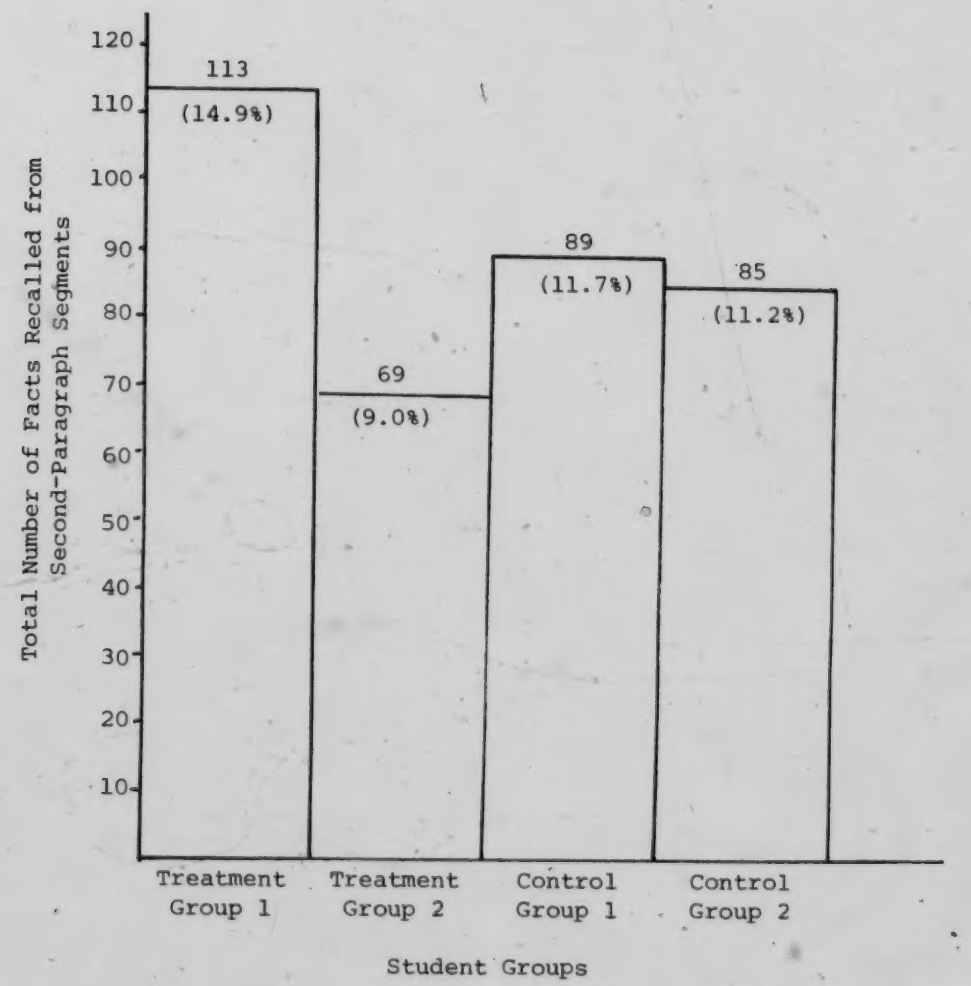

Figure 4.7

Total Number of Facts Recalled from Second-Paragraph Segments by Each Group

these segments, Control Group 1 recalled 11.7 percent of the facts and Control Group 2 recalled 11.2 percent of the facts.

The percentage of facts recalled from second paragraph segments was lower than the percentage of facts recalled from first paragraph segments. In general, these percentages were too low to be regarded as evidencing a complete understanding of the passage. However, again the limitations of oral recalls should be considered and it could have been that had some questions been asked after reading, students would have been able to recount more details.

Figure 4.8 presents the mean number of facts recalled by each group from second paragraph segments. An analysis of variance of these means suggested that the effect of treatment was significant, $p = .0023$, $F(3,76) = 2.76$ (Table 4.4).

Further analysis using the Newman-Keuls procedure suggested that significant differences existed between Treatment Groups 1 and 2 and between Treatment Group 1 and Control Group 2. No significant difference was found between Treatment Group 1 and Control Group 1. Null Hypothesis 4 then cannot be completely rejected.

However, it did seem that the effects of the superordinate advance organizers did continue to aid readers in this group to recall facts from second paragraph segments for which no organizers were given. These results do not correspond with those of Rickards (1976) who found that college level readers who were given advance organizers for related paragraphs were unable to yield significantly more facts from unrelated paragraphs than a control group. However, in his study Rickards had placed a time limit on the reading of each

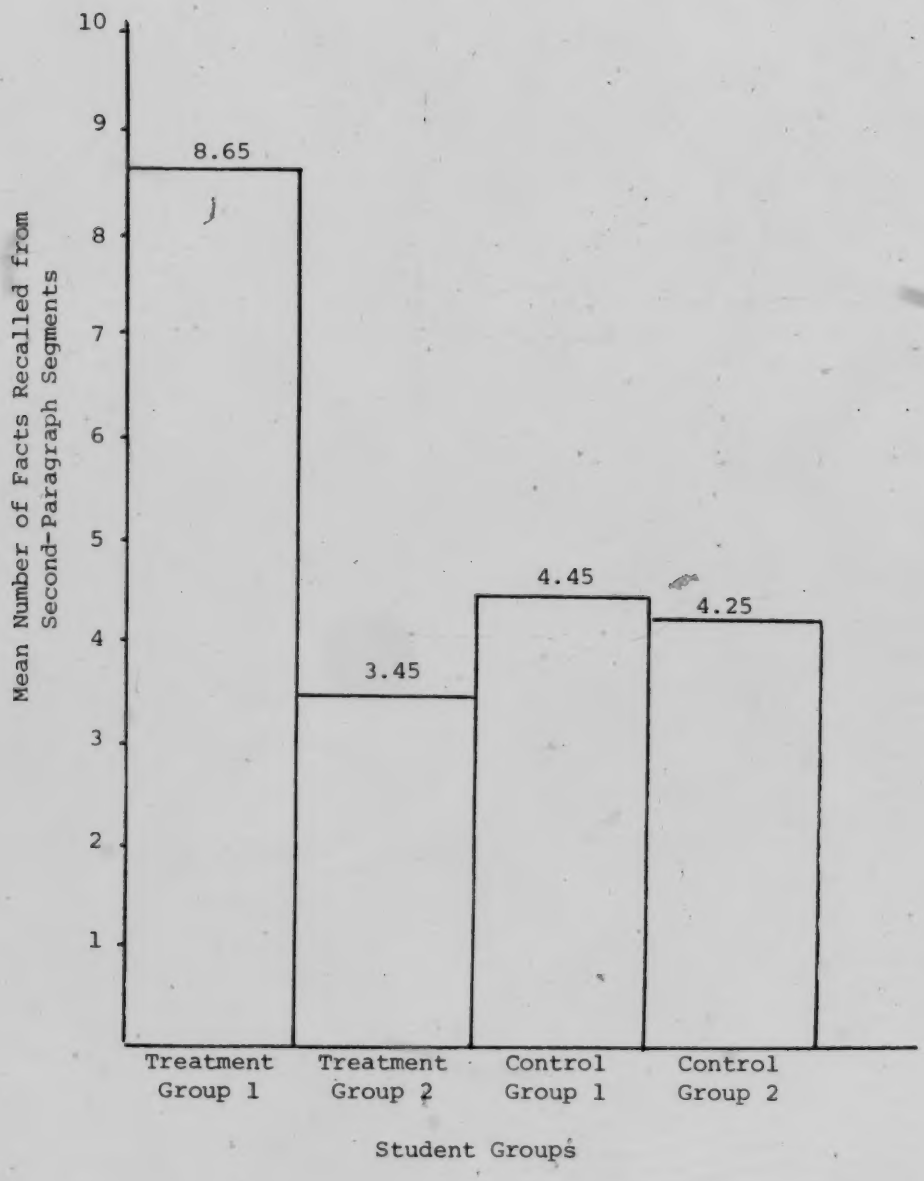

Figure 4.8

Mean Number of Facts Recalled from Second-Paragraph Segments by Each Group

Table 4.4

Analysis of Variance: Mean Number of Facts Recalled from Second-Paragraph Segments

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-Ratio	Probability
Groups	.3285	109.53	3		
				7.33	.0002
Error	.1136	14.95	76		

$F_{.95}(3,76) = 2.76$

text segment and this could have limited the kinds of processing activities in which readers could engage. In the present study there were no restrictions placed on reading time and this could have facilitated the development of subsumptive activity for the second paragraph text segments. That this seemed to have happened was evidenced by the superior performance of Treatment Group 1 in recalling facts from second paragraph text segments.

Although statistically significant differences in performance ($p < .05$) were not found between Treatment Group 1 and Control Group 1, it could have been that Control Group 1 contained readers who were more proficient readers in general (Table 3.1) and were better able to independently organize these second paragraph segments. In fact Winer and Cromer (1967) have suggested that more proficient readers are those who can spontaneously segment material into semantically meaningful units. Since Control Group 1 contained more proficient readers as measured by the Stanford Reading Achievement Test, the differences that existed between the recalls of this group and those of Treatment Group 1 became even more pointed. It the superordinate advance organizer was indeed the factor which influenced the reading recalls, then the use of such organizers could have a profound positive influence in the development of reading comprehension in word-by-word readers.

The effectiveness of superordinate advance organizers on the reading recalls in the present study was most dramatically noted when their influence on the recalls of main ideas and facts from across the whole passage was examined.

Differences in Performance of Groups in Recall of Main Ideas and Facts from Across the Passage

When the effects of the treatments and controls were examined across the passage as a whole, significant differences were found in both the total number of main ideas and total number of facts recalled.

For main ideas across the total passage, Treatment Group 1 recalled 49 percent, Treatment Group 2 recalled 26.3 percent, Control Group 1 recalled 27.3 percent and Control Group 2 recalled 27.3 percent. Figure 4.9 shows the mean number of main ideas recalled by individuals in each group. Significant differences were found at the .01 level, $F(3,76) = 4.13$ (Table 4.5) for the effects of treatment and a further analysis using the Newman-Keuls procedure suggested that significant differences existed between Treatment Group 1 and each of Treatment Group 2, Control Group 1 and Control Group 2. However, no significant differences were found between Treatment Group 2 and either of the Control Groups.

The same procedures carried out with total facts recalled from across the passage suggested that Treatment Group 1 recalled 17.5 percent of the possible facts, Treatment Group 2 recalled 9.6 percent of the possible facts, Control Group 1 recalled 13.7 percent of the possible facts and Control Group 2 recalled 12.1 percent of the possible facts. An analysis of variance revealed significant differences in the effects of treatment at the .01 level ($F(3,76) = 2.76$, $p \leq .05$) and a further examination using the Newman-Keuls comparison of means suggested that Treatment Group 1 was significantly different from Treatment Group 2 and both Control Groups (Table 4.6).

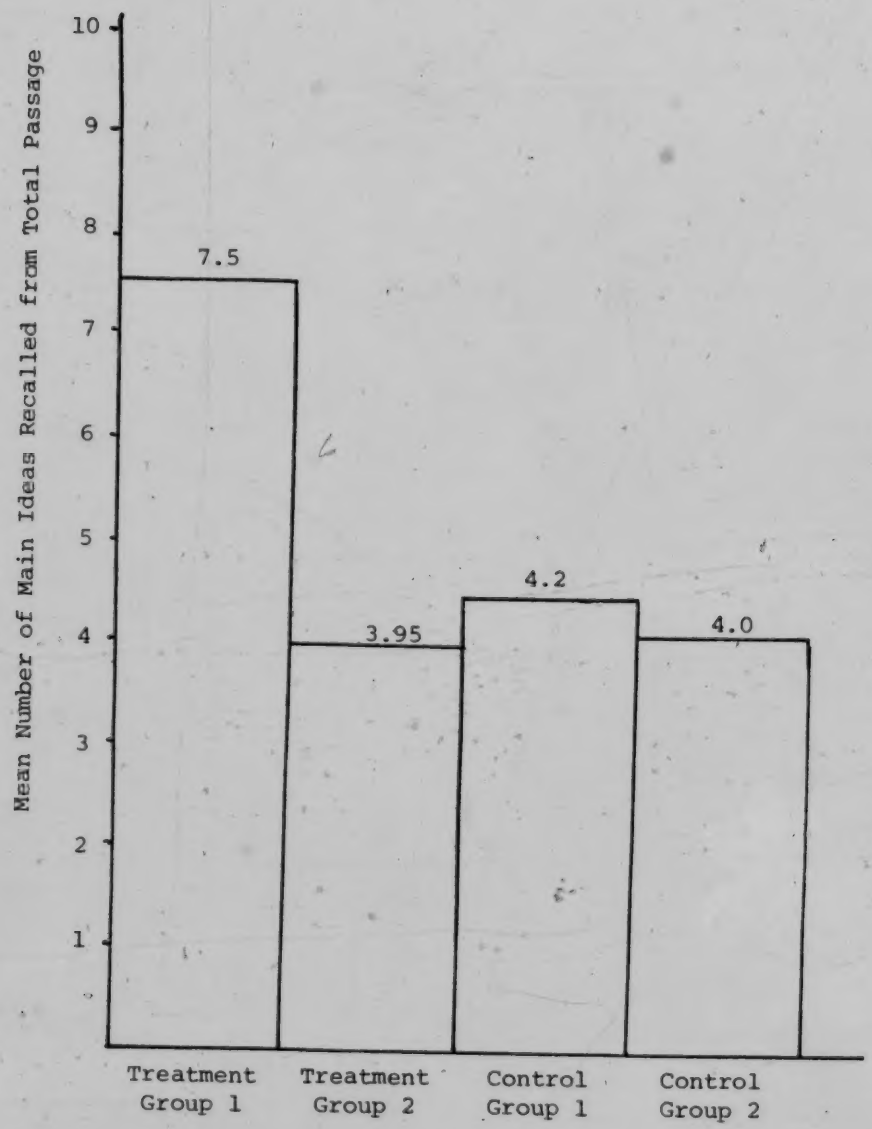

Figure 4.9

Mean Number of Main Ideas Recalled by Individuals in Each Group from Across the Total Pasage

Table 4.5

Analysis of Variance: Mean Number of Main Ideas Recalled from Across the Total Passage

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-test $\alpha = .000001$
Groups	.1774	59.15	3	14.31
Error	.3141	4.13	76	

$F_{.95}(3,76) = 2.76$

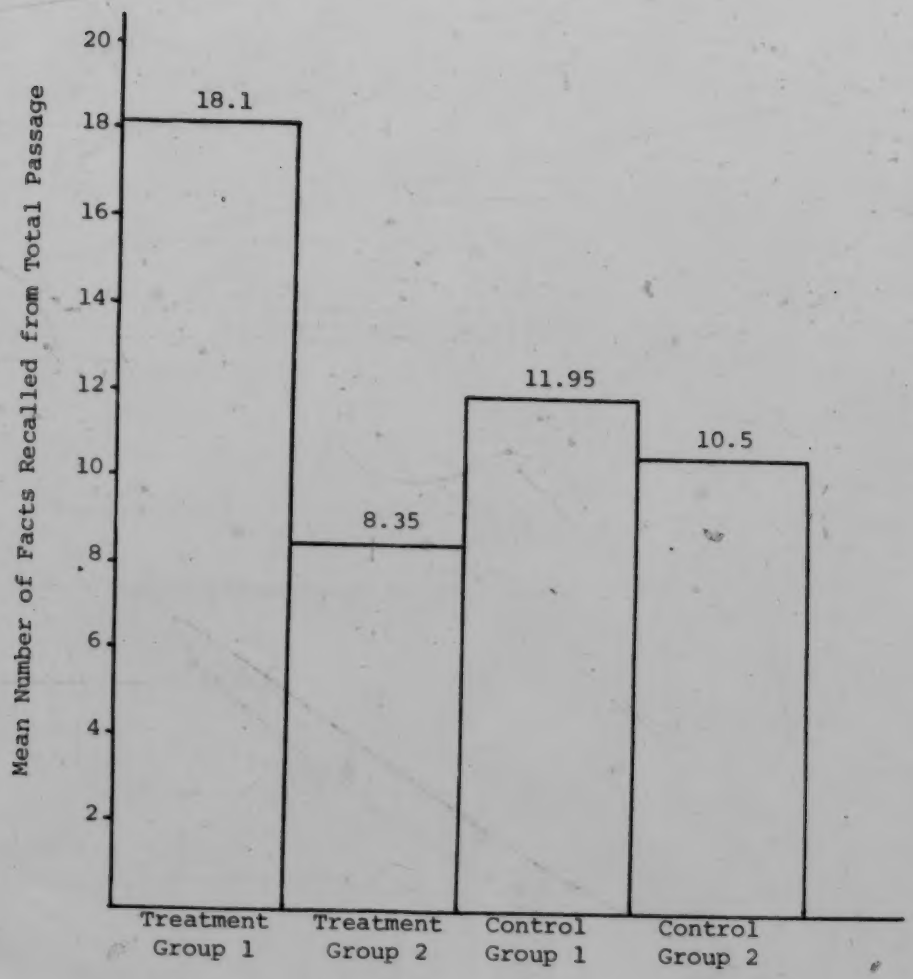

Figure 4.10

Mean Number of Facts Recalled by Individuals in Each Group from Across Total Passage

Table 4.6

Analysis of Variance: Mean Number of Facts from Across the Passage

Source of Variation	Sum of Squares	Mean Squares	Degrees of Freedom	F-Test $\alpha = .00027$
Between Groups	.1051	350.55	3	7.15
Error	.3728	49.06	76	

$F_{.95}(3,76) = 2.76$

It seemed therefore that superordinate advance organizers were having an effect on the recall of information from across the total passage. However, it must also be considered that the total amount of information recalled by each group from the passage was not at a level that could be considered a significant measure of comprehension. As previously mentioned this could have been the result of the use of oral recalls as a measure of text understanding. The posing of some questions after the recall might have given some assistance to those students who were reluctant to take risks and the results might have improved. Whether or not this increase in percentage of main ideas and facts recalled would indeed occur has yet to be determined.

Correlations for Total Number of Main Ideas and Total Number of Facts Recalled

Pearson product-moment correlation coefficients were calculated for each of the four groups to compare the total number of main ideas recalled and the total number of facts recalled with selected sample variables. The selected sample variables were sex, reading words, reading paragraphs, verbal intelligence, cognitive synthesis, language arts scores and reading time. In addition a correlation coefficient was calculated to determine the strength of the relationship between the recall of main ideas and the recall of facts.

From Table 4.7 it can be seen that significant positive correlations were found in Treatment Groups 1 and 2 and Control Group 2 between the total number of main ideas and total number of facts recalled. Control Group 1 did not evidence a positive correlation

Table 4.7

Correlations Between Total Number of Main Ideas Recalled and Selected Sample Variables

	Treatment Group 1	Treatment Group 2	Control Group 1	Control Group 2
Sex	-.204	-.300	.245	.243
Reading Words	.044	.224	.426	.121
Reading Paragraphs	.047	.081	.228	.189
Verbal Intelligence	.078	.166	.017	.115
Synthesis	.426	.232	.502*	.054
Language Arts	.240	.541	.056	.058
Reading Time	-.616*	.140	.350	-.089
Total Number of Facts Recalled	.843*	.530*	.241	.706*

N = 20

* Significant at $p \leq .05$

between the total number of main ideas and total number of facts recalled but did show a positive correlation between total number of main ideas and the type of cognitive synthesis done by students. Since the correlation between cognitive synthesis and number of main ideas recalled is positive in Control Group 1, it could have been that those students who were primarily simultaneous synthesizers recalled more main ideas and as they read would not have attended as carefully to facts. In Treatment Group 1, however, it could have been that once students were given the main idea they could then have been able to attend more carefully to supporting facts and could recall both main ideas and supporting facts. Treatment Group 2 on the other hand may have been alerted by the advance organizer condition to attend to facts from first paragraph segments and, therefore, might also have attended to main ideas from these segments. Thus a weak positive correlation would exist between number of main ideas and facts recalled by Treatment Group 2. The positive correlation exhibited in Control Group 2 between number of main ideas and facts recalled could suggest that students in this group who recalled a main idea were likely to also recall supporting facts. The existence of this type of correlation was not unusual if the subsumption theory of memory is accepted as viable (Ausubel, 1968). If these students had a main idea already in memory, since only immediate recalls were taken, it could have been a relatively simple task to recall a detail related to that main idea.

The only other significant correlation represented in Table 4.7 was in Treatment Group 1. The significant negative correlation

found in this group between the number of main ideas recalled and reading time seemed to suggest that when superordinate advance organizers were used students could recall more main ideas after a shorter reading time. Given the main ideas of certain segments in the organizer condition students could have been able to make efficient use of reading time. This seemed to provide verification of Rickards' (1976) theory that reading time would undoubtedly have an effect on the type of processing of text in which students would engage.

Turning to the correlations between the recall of facts and selected variables, it was interesting to note the significant positive correlations between reading achievement scores on both word and paragraph subscales and the number of facts recalled by Treatment Group 2 and Control Groups 1 and 2 (Table 4.8). There were no significant correlations noted in Treatment Group 1 between total number of facts recalled and either of the reading achievement scores. It could be that for this group, the superordinate advance organizer provided sufficient aid for the students so that any difficulties with reading were alleviated. Since these students had been given main ideas of selected paragraphs in the treatment condition, those students who might have had difficulty with the task of extracting and recalling main ideas were given help. This would not have been the case in the other three groups and their resultant performance could have been more affected by their reading achievement, thus resulting in significant positive correlations.

In Treatment Group 1 the significant positive correlation

Table 4.8

Correlations Between Total Number of Facts Recalled and Selected Sample Variables

	Treatment Group 1	Treatment Group 2	Control Group 1	Control Group 2
Sex	-.275	.125	.200	.209
Reading Words	.293	.550*	.637*	.451*
Reading Paragraphs	.265	.528*	.493*	.480*
Verbal Intelligence	.298	.448*	.301	.464
Synthesis	.271	.360*	.106	.215
Language Aids	.461*	.475*	.526*	.252
Reading Time	.687*	.147	-.297	-.090
Total Number of Main Ideas Recalled	.843*	.530*	.241	.706*

N = 20

* Significant at $p < .05$

between reading time and number of facts recalled suggested that with greater reading time, students recalled more facts. This suggested that when students took a longer time to read the passage, they could have been attending more to details of the passage rather than to the main ideas. In fact, since this correlation was positive and the correlation between reading time and main ideas for this group was negative, it could have been that those students who read the passage more quickly made greater use of the superordinate advance organizers than others. It is difficult in this study to arrive at a definitive reason for these correlations between reading time and total number of main ideas and facts recalled, so reading time might be a variable for any future study to carefully consider.

The other significant correlations noted in Table 4.8 were in Treatment Groups 1 and 2 and Control Group 1 between Language Arts scores and total number of main ideas recalled. Speculation on the reasons for these correlations are tentative. The Language Arts scores were derived from teacher made tests and as such might be quite subjective. It could also be that the nature of the tests was such that recall of detail was more important than recall of main ideas but since the exact nature of the tests was not determined and since they were developed by a number of different teachers any conclusions made about these correlations would be questionable.

Summary

Treatment Group 1, which received superordinate advance organizers interjected in text, consistently recalled a greater number

of main ideas and facts from both first and second paragraph segments. However, since the percentage of total information recalled by all groups was lower than is usually accepted as reasonable measures of comprehension, the results of the study may not be readily generalizable.

Chapter V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

This chapter will present a brief summary of the study, the main findings and conclusions. In addition, further limitations, implications of the study for the teaching of reading comprehension and suggestions for further research will also be discussed.

Summary of the Study

This study was designed to investigate the effects of advance organizers, both superordinate and coordinate statements interjected within a fifteen-paragraph text, on the content of the oral recalls of eighth grade readers. The effects of the advance organizers were examined through the number and position of main ideas recalled and through the number and position of facts supporting main ideas recalled from a fifteen-paragraph passage. A sample of 80 readers, representing a range of reading ability from low to average to high proficiency was selected from an initial population of 200 eighth grade students.

The Stanford Reading Achievement Test, words and paragraph reading scores were used to obtain a measure of reading proficiency for all subjects. In addition, verbal intelligence scores based on the Canadian Lorge-Thorndike Intelligence Tests, Level 4, Form A, were obtained from the cumulative record cards of all subjects. A measure of synthesizing ability was obtained from the Test of Clustering in Recall (Bousfield in Latham, 1973) administered by the researcher.

The sample for the study was divided into four groups of

twenty students each as follows: Treatment Group 1 which received a passage containing superordinate advance organizers to read, Treatment Group 2 which received a passage containing coordinate advance organizers to read, Control Group 1 which received a passage containing interjected control statements to read and Control Group 2 which received only the passage to read. Students from each group were met individually and following their silent reading of the passage, oral recalls were taken.

The oral recalls were transcribed and analyzed according to the procedure developed by Cofer (1946) and modified by Howe (1970) by independent judges to determine the number and position of facts and main ideas recalled from the passage.

The data were analyzed using a one-way analysis of variance followed by a Newman-Keuls procedure for the multiple comparison of means. In addition, Pearson product-moment correlations were used to determine the possible influence of selected student sample variables on the study.

Main Findings and Conclusions

Four research questions and hypotheses were posed and an analysis of data was made in an attempt to answer these questions and hypotheses.

Research Question 1

Will superordinate advance organizers interjected before each two-paragraph text segment produce greater recall of more main ideas from the first paragraphs of two-paragraph text segments than coordinate

advance organizers, interjected control statements and uninterrupted reading?

Null Hypothesis 1

There will be no significant differences between treatment groups in the mean number of main ideas recalled from first paragraphs of two-paragraph text segments.

(Level of significance: $p < .01$)

The mean performances for the four groups were significantly different ($p < .01$). These findings did not support the null hypothesis; therefore, it was rejected.

A further analysis of the data suggested that only Treatment Group 1, the superordinate advance organizer group, evidenced significantly superior performance in the number of main ideas recalled from first paragraph segments. This suggests that the superordinate advance organizers aided students who might have had difficulty independently abstracting main ideas from the passage. Since there were no significant differences between Treatment Group 2 and either of the Control Groups in the number of main ideas recalled the above conclusion seems substantiated.

Research Question 2

Will superordinate advance organizers interjected in text before each two-paragraph text segment produce recall of more main ideas from second paragraph text segments than interjected coordinate advance organizers, interjected control statements or uninterrupted reading?

Null Hypothesis 2

There will be no significant difference between groups in the mean number of main ideas recalled from second paragraphs of two-paragraph text segments.

(Level of significance: $p < .01$)

The mean performances for the four groups was significantly different ($p < .01$). These findings were further analyzed using the Newman-Keuls procedure. It was found that Treatment Group 1, the superordinate advance organizer group, was significantly superior in recall of main ideas from second paragraph text segments to Treatment Group 2 and both of the Control Groups. No significant differences were found between Treatment Group 2 and the Control Groups. Null Hypothesis 2 was, therefore, rejected.

On this measure then superordinate advance organizers do seem to aid readers' recall information of a main idea nature. Given the main ideas of first paragraph segments in the superordinate advance organizer condition, students seem then to be able to use this information to help abstract main ideas from second paragraph text segments.

Students in Treatment Group 2 and the Control Groups did not have this aid and had to independently abstract this main idea information and the resultant recalls showed less evidence of main ideas from these second paragraph segments. This suggests that in reading, students given superordinate advance organizers for a portion of the material read, may be able to use these organizers to help them independently organize related material for which no specific

organizer is given. However, care must be taken to ensure that the advance organizer is of a superordinate nature for, as can be seen from the present study, an organizer not at this level may be of no assistance or may even interfere in text processing.

Research Question 3

Will interjected superordinate advance organizers produce recall of more facts from the first paragraphs of two-paragraph text segments than interjected coordinate advance organizers, interjected control statements or uninterrupted reading?

Null Hypothesis 3

There will be no significant difference between groups in the mean number of facts recalled from first paragraphs of two-paragraph text segments.

(Level of significance: $p < .01$)

The mean performance of Treatment Group 1, the superordinate advance organizer group was significantly higher than that of Treatment Group 2 or either of the Control Groups. These findings indicate rejection of the null hypothesis.

Again, although Treatment Group 1 recalled significantly more facts than Treatment Group 2 or the Control Groups, there were no significant differences between Treatment Group 2 and the Control Groups. This suggests that students given superordinate advance organizers were able to select facts related to or supporting main ideas more efficiently than others. The superordinate advance organizers may have given clues to the meaning of the passage and

helped establish a meaningful learning set which still allowed details relating to the main idea to be distinguished. Alternately students in the other groups might have had difficulty abstracting the main idea from passage details and might have never developed an overriding concept under which pertinent details could be subsumed. This suggests that if students are expected to recall details from reading, a superordinate advance organizer might aid them in selecting pertinent information.

Research Hypothesis 4

Will interjected superordinate advance organizers interjected in text produce recall of more facts from second paragraphs of two-paragraph text segments than interjected coordinate advance organizers, interjected control statements of uninterrupted reading.

Null Hypothesis 4

There will be no significant difference between groups in the mean number of facts recalled from second paragraph text segments.

(Level of significance: $p < .01$)

The mean performance of Treatment Group 1, the superordinate advance organizer group was significantly higher than the mean performance of Treatment Group 2 or either of the Control Groups ($p < .01$). These findings suggest rejection of the null hypothesis.

It seems from this finding that students who received superordinate advance organizers were able to use these organizers as aids to abstracting main ideas from second paragraph segments and then selecting facts to support these main ideas. There seemed to be some

evidence that there was a subsumption process occurring in the superordinate advance organizer group which enabled students both to abstract main ideas and subsume related details under these abstractions. That this subsumption process was not occurring to a great extent in the other groups seems evidenced by the lower level of performance and the lack of differentiation in performance of these groups. It seems therefore that the use of superordinate advance organizers for certain portions of a text might then be beneficial in aiding students organize and recall details from related portions of a text.

General Conclusions

On the basis of the findings reported in this study, the following general conclusions were drawn:

1. Superordinate advance organizers interjected in text before each two-paragraph segment enabled students to recall more main ideas and facts from first paragraph segments than did coordinate advance organizers, interjected control statements or uninterrupted reading.

2. Superordinate advance organizers interjected in text before each two-paragraph text segment aided students in the independent organization and recall of main ideas and facts from second paragraph text segments.

3. Coordinate advance organizers interjected in text before each two-paragraph text segment did not provide aid to students in the recall or organization of main ideas or facts from either first

or second paragraph segments of the text. It seems therefore that the type of advance organizer used would probably have a significant effect on the student's organization and recall of text material.

Limitations

In addition to the limitations cited in Chapter I, the following limitations must be considered in interpreting these findings:

1. Although significant differences between groups were noted which suggested that superordinate advance organizers provided better recall of main ideas and facts from the passage, the percentage of information recalled must also be considered. None of the groups recalled more than 60 percent of the passage material as indicated by the analysis of oral recalls. According to measures of comprehension suggested by most informal reading inventories these percentages do not indicate adequate comprehension of the text material; thus any conclusions or implications drawn from this study should reflect this inadequacy. However it should also be noted that the majority of informal reading inventories are based on the reading of narrative material. Since expository material, because it is written in a different style and tends to be more factual in nature, is more difficult for readers (Ausubel, 1968), it could be that the results of this study reflect a valid indication of the performance of junior high students with this type of material.

2. The extent to which the attitude of the students towards reading and school in general affected their performance is not known.

3. The extent to which content of the passage was familiar to students is not known. An attempt was made to control for this by the use of material not usually covered in or before the eighth grade science curriculum and by selecting the passage from a text which was not used in the school. If the content of the passage was novel, then the influence of background information on recall would be minimized.

4. The use of oral recalls to determine comprehension, although good in an experimental situation, is not practical in the classroom. Differing results might have been obtained if students were given a written test after reading, asked to take notes throughout reading or asked for written recalls.

5. Reading time in this study was unlimited. Results might have differed were students given a specific time limit for reading the passage.

Implications of this Study

This study has implications for the teaching of reading and study skills at the junior high level.

1. Major purposes or goals to be achieved from the reading of a specific passage could be outlined for the students. These goals then would act as superordinate advance organizers and the students, having these concepts in mind, would be able to read purposefully, abstracting pertinent main ideas and concepts. Having learned to use this aid, the students may then be able to independently abstract main ideas from portions of the text for which no direct

assistance is given (Rickards, 1976).

2. Superordinate advance organizers given to students could be used as central ideas for independent notetaking. Skimnerlik (1976) has suggested that written notes facilitated the recall of text material. Thus it seems logical that superordinate advance organizers given to aid organization and recall from reading combined with written notes organized around these superordinate concepts would become powerful study aids and should also be considered by educators.

3. Superordinate advance organizers by providing an over-riding concept could be particularly beneficial in helping students read material with a high informational content. In literature, providing students with some general overriding themes of several pieces of work may help them to schematize and understand the individual works.

4. Weiner and Cromer (1967) have suggested that a number of poor readers fail to comprehend because they tend to be word by word processors of information. The superordinate advance organizer, if it is simple and direct in nature, could help these readers by giving them the main idea of a passage. These readers might benefit from the framework for reading provided by the superordinate advance organizers. Given this framework they might begin to engage in the semantic chunking of material described by Smith (1971).

5. In textbook material the use of superordinate advance organizers interjected before passages of technical information may help students abstract essential concepts. Combined with questions of literal, inferential and evaluative levels constructed for use

after reading, the superordinate advance organizer could provide an excellent conceptual framework for the reading of difficult material.

6. In the teaching of reading or any other subject, teachers could provide superordinate advance organizers which would relate the new concept to be learned to those previously encountered and stored in long term memory. In this way the teacher would be able to assist the student develop a conceptualization of the logical content of the whole subject.

Suggestions for Further Research

The following suggestions are made for further research with junior high school students:

1. A comparative study of the use of superordinate advance organizers with high, average and low achieving eighth grade readers to determine whether the organizers benefit one group more than another is appropriate. If this study is conducted it is suggested that both immediate and delayed recalls be taken to determine if the effects of the organizers differ over time.

2. A study of the use of superordinate advance organizers with homogeneous groups of readers but followed by both oral recalls and questions after reading to test comprehension needs to be done. This would help determine whether the superordinate advance organizers combined with questions produce adequate measures of reading comprehension.

3. Further research with advance organizers and reading material other than literature may be conducted.

4. A long term study involving the teaching of a specific area with the use of superordinate advance organizers would contribute to the understanding of organizers in specific settings.

5. Since there had been few studies conducted with the use of advance organizers for junior high students, the students in the present study were selected so that they represented a range of high, average and low achieving eighth-grade readers. Further studies could be conducted in which the effects of advance organizers on the comprehension of low achieving readers are compared with the effects of advance organizers on high achieving readers. A comparative study such as this would give valuable insights as to the value of advance organizers in remedial reading situations.

6. Further research which examines more closely the effects of statements of facts from the passage and the effects of distracting statements on the reading recalls of students would give some insight as to the precise nature of the type of advance organizer that aids readers.

7. It would be beneficial if a further study were conducted which tested specifically whether students are able to recall the main idea of the whole passage. This information would help to determine whether students given advance organizers for passage segments are able to synthesize these organizers to develop their own concept of the main idea.

Concluding Statement

The evidence presented in this study suggests that superordinate advance organizers interjected in text aid eighth-grade students in the recall of facts and main ideas from English literature material. This suggests that the use of these superordinate organizers in subject areas may aid eighth-grade students who are having difficulty coping with the increasing amount of print they are expected to read.

BIBLIOGRAPHY

BIBLIOGRAPHY

Allen, D. I. Some effects of advance organizers and level of question on the learning and retention on written social studies material. Journal of Educational Psychology, 1970, 61, 333-339.

Alsop, S. and Lapp, R. The strange death of Louis Slotin. In U. Baum (Ed.), Non fiction II. New York: Macmillan Company, 1969.

Anderson, R. and Biddle, W. On asking people questions about what they are reading. In D. Ausubel (Ed.), Educational psychology: A cognitive view. New York: Holt, Rinehart and Winston, 1968.

Ausubel, D. Some psychological aspects of the structure of knowledge. In P. Johnson (Ed.), Learning theory and practice. New York: Thomas Y. Cromwell Company, 1971.

Ausubel, D. The psychology of meaningful verbal learning. New York: Grune and Stratton, 1963.

Ausubel, D. The use of advance organizers in the learning and retention of meaningful verbal material. Journal of Educational Psychology, 1960, 51, 267-272.

Ausubel, D. and Fitzgerald, D. Organizer, general background and antecedent learning variables in sequential verbal learning. Journal of Educational Psychology, 1962, 53, 243-249.

Ausubel, D. and Robinson, F. School learning: An introduction to educational psychology. New York: Holt, Rinehart and Winston, 1969.

Barnes, B. and Clauson, E. Do advance organizers facilitate learning? Recommendations for further research based on an analysis of 32 studies. Review of Education Research, 1975, 45, 637-659.

Bertou, D. P., Clasen, R. E. and Lambert, P. An analysis of the relative efficacy of advance organizers, post organizers, interspersed questions and combinations thereof in facilitating learning and retention from a televised lecture. Journal of Educational Research, 1972, 65, 329-333.

Biggs, J. Information and human learning. Glenview: Scott Foresman, 1971.

Bloom, S. The taxonomy of educational objectives. I. Cognitive domain. New York: McKay, 1956.

Bousfield, W. The occurrence of clustering in free recall of randomly arranged associates. In N. J. Samecka (Ed.), Human learning and memory: Selected readings. New York: Oxford University Press, 1967.

Campbell, D. and Borich, G. A study of text processing and intrinsic individual differences in conceptual organization. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, 1973.

Clay, M. Reading: The patterning of complex behaviour. Auckland: Heinneman Educational Books, 1972.

Cofer, C. A comparison of logical and verbatim learning of prose passages of different lengths. American Journal of Psychology, 1941, 54, 1-21.

Cohen, B. and Bousfield, W. The effects of a dual level stimulus word list on the occurrence of clustering in recall. Journal of General Psychology, 1956, 55, 51-58.

Cromer, W., The difference model: A new explanation for some reading difficulties. Journal of Educational Psychology, 1970, 61, 471-483.

Cromer, W. and Wiener, M. Idiosyncratic response patterns among good and poor readers. Journal of Consulting Psychology, 1966, 30, 1-10.

Cummins, J. and Das, J. Cognitive processing and reading difficulties: A framework for research. The Alberta Journal of Educational Research, 1977, XXIII, 245-256.

Dale, E. and Chall, J. A formula for predicting readability: Instructions. Educational Research Bulletin, 1948, 27, 37-54.

Doake, D. An investigation into the facilitative effects of two kinds of adjunct questions on the learning and remembering of teacher's college students during the reading of textual materials. Unpublished master's thesis, University of Canterbury, 1972.

Eisner, E. Five conceptions of curriculum: Their roots and implications for curriculum planning. Berkeley: McCutchan Publishing Corporation, 1972.

Ferguson, G. Statistical analysis in psychology and education (3rd ed.). Toronto: McGraw-Hill Book Company, 1971.

Frase, L. Boundary conditions for mathemagenic behaviours. Review of Educational Research, 1970, 40, 325-336.

Gagné, R. Context, isolation and interference of effects on the retention of facts. Journal of Educational Psychology, 1969, 60, 408-414.

Gagné, R. and Wiegand, U. Effects of a superordinate context on learning and retention of facts. Journal of Educational Psychology, 1970, 61, 406-409.

Glass, G. and Stanley, J. Statistical methods in education and psychology. New Jersey: Prentice-Hall, 1970.

Goldberg, I. J. Advance organizers with junior school students. Educational Research, 1966, 9, 57-64.

Hartley, J. and Davies, I. K. Preinstructional strategies: The role of pretests, behavioral objectives, overviews and advance organizers. Review of Educational Research, 1976, 46, 239-265.

Howe, M. Repeated presentation and recall of meaningful prose. Journal of Educational Psychology, 1970, 61, 214-219.

Jerrolds, B. W. The effects of advance organizers in reading for the retention of specific facts. (Doctoral dissertation, University of Wisconsin, 1967). Dissertation Abstracts, 1968, 28, 4532A.

Klare, G. R. Assessing readability. Reading Research Quarterly, 1975, 10(1), 62-102.

Klare, G. R. The measure of readability. Iowa: Iowa State University Press, 1963.

Kuhn, D. J. and Novak, D. A study of cognitive subsumption in the life sciences. Science Education, 1971, 55, 309-320.

Latham, R. Cognitive synthesis and reading comprehension. Unpublished doctoral dissertation, The University of Alberta, 1973.

Lorge, I., Thorndike, R. and Hagen, E. The Lorge-Thorndike Intelligence Tests. Canadian multi-level edition, verbal and non verbal batteries. Thomas Nelson and Sons (Canada), 1967.

Luria, A. The working brain: An introduction to neuropsychology. Harmondsworth: Penguin Books, 1973.

Neisser, U. Cognitive psychology. New York: Meredith Publishing Company, 1967.

Neisworth, J. The use of advance organizers with the educable mentally retraded. Dissertation Abstracts, 1968, 28, 4539A.

Perkins, J. Human development and learning. New York: Macmillan Company, 1969.

Rickards, J. Effects of advance organizers interspersed in text. Reading Research Quarterly, 1976, XI, 599-622.

Rickards, J. Interaction of position and conceptual level of adjunct questions on immediate and delayed retention of text. Journal of Educational Psychology, 1976, 68, 210-217.

Rickards, J. Processing effects of advance organizers interspersed in text. Reading Research Quarterly, 1976, XI, 599-622.

Rickards, J. and August, T. Generative underlying strategies in prose recall. Journal of Educational Psychology, 1975, 67, 860-865.

Rickards, J. and Di Vesta, F. Type and frequency of questions in processing text material. Journal of Educational Psychology, 1974, 66, 354-362.

Schultz, R. The role of cognitive organizers in the facilitation of concept learning in elementary school science. Dissertation Abstracts, 1967, 27, 3784A.

Schwab, J. The practical: A language for the curriculum. In D. E. Purpel and M. Belanger (Eds.), Curriculum and the cultural revolution. Berkeley: McCutchan Publishing Corporation, 1972.

Shimnerlik, S. and Nolan, J. Reorganization and the recall of prose. Journal of Educational Psychology, 1976, 68, 779-786.

Smith, F. Comprehension and learning: A conceptual framework for teachers. Toronto: Holt, Rinehart and Winston, 1975.

Smith, F. Understanding reading. Toronto: Holt, Rinehart and Winston, 1971.

Steinbrink, J. E. The effectiveness of advance organizers for teaching geography to disadvantaged rural black elementary students. Unpublished doctoral dissertation, University of Georgia, Athens, 1970.

Thorndike, R. L. and Hagen, E. Canadian Lorge-Thorndike Intelligence Tests: Technical supplement. Toronto: Thomas Nelson and Sons, 1972.

Winer, B. J. Statistical principles in experimental design. New York: McGraw-Hill Book Company, 1962.

APPENDICES

APPENDIX A

PASSAGE CONTAINING INTERJECTED SUPERORDINATE ADVANCE ORGANIZERS

Louis Slotin was a brilliant young scientist.

Louis Alexander Slotin was born in 1912 in Winnipeg, Canada. At the age of fifteen he entered Winnipeg's University of Manitoba, and received his master of science degree at the tender age of twenty-one. He studied physics for four years at the University of London and got his Ph.D. in 1936.

In 1937 he was in Chicago apparently on his way home to Winnipeg, when he ran into Professor William Harkins an atomic chemist from the University of Chicago. Harkins said that he badly needed an assistant for cyclotron work, but he had no money to pay an assistant. Slotin immediately went to work for nothing a week—a salary for which he worked for almost two years.

Slotin was involved in a secret atomic bomb project with Professor Harkins from Chicago.

His work at Chicago University led him directly into the Manhattan District, the super-secret wartime atomic project. He worked for a time in Chicago, then at Indiana University, and later at Oak Ridge. In late 1943, Slotin came to Los Alamos, when the job of actually putting the atomic bomb together was started, and there he began to tickle the dragon's tail.

So much for the bare facts. The bare facts, of course, do not answer the question: What kind of man was Louis Slotin? "No man," John Donne wrote, "is an island unto himself." Yet Louis Slotin was more nearly an island unto himself than most men. He was very reserved. "Louis was a sweet guy," one of his former colleagues has remarked, "but no one has ever got to know him really well."

Slotin was a quiet, brave man with a liking for danger.

Even so certain well-marked characteristics of the man emerge. In the first place, Slotin was a brave man but brave in an odd sort of way. "Slotin had a positive liking for danger," another of those who knew him says. "He always seemed suffering from an inner tension, and he was always very quiet. But he was quite happy when he was doing something dangerous."

This hankering for danger led Slotin to pester the Manhattan District authorities to allow him to accompany the first atomic bombs to their Japanese targets, as a scientific observer. When the authorities refused, Slotin was depressed for weeks. And the same strange hankering no doubt led Slotin to become the Manhattan District's chief practitioner of the art of tickling the dragon's tail.

The liking for danger led him to Manhattan District where he performed a very important experiment with the material for the bomb.

This experiment was not a kind of scientific Russian roulette which Slotin and the other young physicists at Los Alamos thought up to relieve their boredom. It was a vitally important experiment, absolutely essential to the bomb making process—and indeed, it is still essential today.

Fissionable material (uranium 235 and plutonium) is queer stuff. Below a certain size and weight, a lump of this heavy grey metal is no more dangerous than a lump of lead. But it has one characteristic which may one day destroy civilization as we know it. For if a certain amount of this metal is brought together all in one place a chain reaction starts within the mass of metal. It is the chain reaction, of course, which lends to the atomic bomb the power to blast a whole city. The amount of metal required for the chain reaction to start is called a critical mass or a "crit."

The crit, or critical mass, which produces a chain reaction can be calculated theoretically but these calculations are never precise.

But how much is a crit? There were and are ways of calculating theoretically the amount of material necessary to form a critical mass. But such calculations can never be completely precise. Besides, in order to get maximum efficiency or killing power, the size of the crit had to be determined under various conditions.

Even today, for security reasons, it is necessary to be a little imprecise about the experiment that Slotin performed in 1946 and which his successors are still performing under very different conditions. It can be said that the idea was to shove together lumps of fissionable material in such quantities and in such relationship to each other that the whole amount just went critical. In other words a chain reaction was permitted to begin—thus establishing the crit—but was stopped before the material became dangerously over critical. The problem was to know when to stop.

Although there was a problem in establishing the crit, the real danger was not an explosion but radioactivity from the fissionable material.

No one at Los Alamos had any illusions about the danger involved. There was no danger that Los Alamos might be blown off the face of the map if something went wrong. In order for the mass to explode, it must somehow be held together by an outside force—this is called maintaining assembly. Otherwise the power of the chain reaction automatically "disassembles the crit." In the meantime, if a true chain reaction is permitted to get under way, the critical mass of fissionable material becomes briefly but intensely radioactive. It sends out precisely the same radioactive rays as an atomic bomb does when it explodes over a city.

Slotin had good reason to be aware of this danger. Before the day when Slotin tickled the dragon's tail for the last time, at least three people at Los Alamos had fallen victim to radioactivity. One of these was Slotin's friend and laboratory assistant, Harry Daglian. Slotin spent many hours at his assistant's bedside during the month that it took Daglian to die.

Slotin's friend had died from radiation and people were worried about Slotin's own health.

Particularly after Daglian died, those in authority at Los Alamos worried about the radiation danger. One Nobel Prize winner told Slotin, "I predict you won't last a year if you keep on doing that experiment." But Slotin happily carried on.

"Sure it's dangerous," Slotin remarked to one friend, "but it has to be that way." One suspects that Slotin, perhaps unconsciously, wanted it to be that way.

When Slotin was asked to perform the experiment just before leaving for Bikini, something went wrong and the material reached the critical point, releasing enough radioactivity to kill.

Ironically, on May 21, 1946, Slotin was performing his experiment for what he knew was to be the last time. For more than two years he had performed the experiment again and again in different ways and under different conditions. He was proud of the fact that he had been chosen to test the criticality of the world's first atomic bomb. Now he had been ordered to Bikini to participate in the bomb tests there. He was eager to be off when final orders came to perform the experiment just once more for the benefit of Scientist X. So Slotin tickled the dragon's tail just once more and the dragon lashed back to destroy him.

APPENDIX B

AN ORDERED LIST OF COORDINATE STATEMENT ADVANCE ORGANIZERS AND INTERJECTED CONTROL STATEMENTS

Coordinate Advance Organizers

1. He studied physics for four years at the University of London and got his Ph.D. in 1936.

2. In late 1943, Slotin came to Los Alamos, when the job of actually putting the atomic bomb together was started and there he began to tickle the dragon's tail.

3. He was quite happy when he was doing something dangerous.

4. It was a vitally important experiment, absolutely essential to the bomb making process—and indeed, it is still essential today.

5. Besides, in order to get maximum efficiency or killing power, the size of the crit had to be determined under various conditions.

6. It sends out precisely the same radioactive rays as an atomic bomb does when it explodes over a city.

7. But Slotin happily carried on.

8. So Slotin tickled the dragon's tail just once more and the dragon lashed back to destroy him.

Interjected Control Statements

1. This is segment one.
2. This is segment two.
3. This is segment three.
4. This is segment four.
5. This is segment five.
6. This is segment six.
7. This is segment seven.
8. This is segment eight.

APPENDIX C

UNINTERRUPTED READING PASSAGE

Louis Alexander Slotin was born in 1912 in Winnipeg, Canada. At the age of fifteen he entered Winnipeg's University of Manitoba, and received his master of science degree at the tender age of twenty-one. He studied physics for four years at the University of London and got his Ph.D. in 1936.

In 1937 he was in Chicago apparently on his way home to Winnipeg, when he ran into Professor William Harkins an atomic chemist from the University of Chicago. Harkins said that he badly needed an assistant for cyclotron work, but he had no money to pay an assistant. Slotin immediately went to work for nothing a week—a salary for which he worked for almost two years.

His work at Chicago University led him directly into the Manhattan District, the super-secret wartime atomic project. He worked for a time in Chicago, then at Indiana University, and later at Oak Ridge. In late 1943, Slotin came to Los Alamos, when the job of actually putting the atomic bomb together was started, and there he began to tickle the dragon's tail.

So much for the bare facts. The bare facts, of course, do not answer the question: What kind of man was Louis Slotin? "No man," John Donne wrote, "is an island unto himself." Yet Louis Slotin was more nearly an island unto himself than most men. He was very reserved. "Louis was a sweet guy," one of his former colleagues has remarked, "but no one has ever got to know him really well."

Even so certain well-marked characteristics of the man emerge. In the first place, Slotin was a brave man but brave in an odd sort of way. "Slotin had a positive liking for danger," another of those who knew him says. "He always seemed suffering from an inner tension, and he was always very quiet. But he was quite happy when he was doing something dangerous."

This hankering for danger led Slotin to pester the Manhattan District authorities to allow him to accompany the first atomic bombs to their Japanese targets, as a scientific observer. When the authorities refused, Slotin was depressed for weeks. And the same strange hankering no doubt led Slotin to become the Manhattan District's chief practitioner of the art of tickling the dragon's tail.

This experiment was not a kind of scientific Russian roulette which Slotin and the other young physicists at Los Alamos thought up to relieve their boredom. It was a vitally important experiment, absolutely essential to the bomb making process—and indeed, it is still essential today.

Fissionable material (uranium 235 and plutonium) is queer stuff. Below a certain size and weight, a lump of this heavy grey metal is no more dangerous than a lump of lead. But it has one characteristic which may one day destroy civilization as we know it. For if a certain amount of this metal is brought together all in one place a chain reaction starts within the mass of metal. It is the chain reaction, of course, which lends to the atomic bomb the power to blast a whole city. The amount of metal required for the chain reaction to start is called a critical mass or a "crit."

But how much is a crit? There were and are ways of calculating theoretically the amount of material necessary to form a critical mass. But such calculations can never be completely precise. Besides, in order to get maximum efficiency or killing power, the size of the crit had to be determined under various conditions.

Even today, for security reasons, it is necessary to be a little imprecise about the experiment that Slotin performed in 1946 and which his successors are still performing under very different conditions. It can be said that the idea was to shove together lumps of fissionable material in such quantities and in such relationship to each other that the whole amount just went critical. In other words a chain reaction was permitted to begin—thus establishing the crit—but was stopped before the material became dangerously over critical. The problem was to know when to stop.

No one at Los Alamos had any illusions about the danger involved. There was no danger that Los Alamos might be blown off the face of the map if something went wrong. In order for the mass to explode, it must somehow be held together by an outside force—this is called maintaining assembly. Otherwise the power of the chain reaction automatically "disassembles the crit." In the meantime, if a true chain reaction is permitted to get under way, the critical mass of fissionable material becomes briefly but intensely radioactive. It sends out precisely the same radioactive rays as an atomic bomb does when it explodes over a city.

Slotin had good reason to be aware of this danger. Before the day when Slotin tickled the dragon's tail for the last time, at least three people at Los Alamos had fallen victim to radioactivity. One of these was Slotin's friend and laboratory assistant, Harry Daglian. Slotin spent many hours at his assistant's bedside during the month that it took Daglian to die.

Particularly after Daglian died, those in authority at Los Alamos worried about the radiation danger. One Nobel Prize winner told Slotin, "I predict you won't last a year if you keep on doing that experiment." But Slotin happily carried on.

"Sure it's dangerous," Slotin remarked to one friend, "but it has to be that way." One suspects that Slotin, perhaps unconsciously, wanted it to be that way.

Ironically, on May 21, 1946, Slotin was performing his experiment for what he knew was to be the last time. For more than two years he had performed the experiment again and again in different ways and under different conditions. He was proud of the fact that he had been chosen to test the criticality of the world's first atomic bomb. Now he had been ordered to Bikini to participate in the bomb tests there. He was eager to be off when final orders came to perform the experiment just once more for the benefit of Scientist X. So Slotin tickled the dragon's tail just once more and the dragon lashed back to destroy him.